

# Proposing Information Communication Technology Solutions for a Business Studio Environment

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## Abstract

The Studio at Copenhagen Business School is one of the first classrooms to combine studio learning and business education, with the goal of teaching a set of non-traditional skills to address today's business needs. The Studio has operated for two years with minimal classroom technology. This project proposed Information Communication Technologies (ICTs) to enhance and expand the activities of the Studio. Our team learned about the Studio's needs through interviews and observations, identified opportunities for improvement, researched technologies that supplement the activities in the Studio, and determined technological solutions that benefit the Studio. This work resulted in a proposal of 21 ICTs and 12 opportunities for improvement that will aid our sponsor as the Studio develops.

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## Chapter 1: Introduction

Businesses and corporations have become an ever-increasing influence on society, due to the introduction and development of the free market. The earliest businesses grew only as big as the family running them; whereas businesses today can span multiple continents and control billions of dollars. A large business failing today could cascade into a wide range of problems, potentially leading to thousands losing their homes and life savings. An example of this happening was in 2008 when multiple banks collapsed, causing a worldwide economic depression. Leaders within large corporations are constantly making decisions that not only affect their profit margins, but also the welfare of others. How schools educate the people making these decisions is extremely important to the health and happiness of society.

Business schools began forming in the early 20th century to educate these leaders. The Harvard Business School was one of the first, established in 1908. The educational approach they adopted is called the Case Study Method (CSM), which is still popular today. Students in a case study program read, study, and discuss various business cases (Rebeiz, 2011). Subsequently, many more international universities established business schools using the Case Study Method, traditional lecture hall learning, or other approaches.

The publications of the Carnegie Council and the Ford Foundation in 1959 spurred a drastic change in the educational approach of business schools towards management as a science (Bailey & Ford, 1996). This model of management was effective in the slower-moving business world of the day. Due to an increase in the speed at which business is conducted, corporations need managers with a new set of skills that enable them to handle and react to the chaos and complexity. This requires 'soft skills' such as teamwork, problem-solving, and creativity

(Freedman, 1992). Business educators have argued that current curricula do not teach these desired skills, and that a new approach is needed (Freedman, 1992; Barry & Meisiek, n.d.).

One of the newly proposed pedagogies is Studio Education, which has been popular in art, design, and architecture programs for hundreds of years. A studio classroom is one that can be changed to support various activities that allow students to “learn by making” (Barry & Meisiek, 2014, forthcoming). Studio classrooms provide a better environment for the development of these newly demanded skills (Hetland, Sheridan, Veenema, & Winner, 2013). If a studio approach to business education is shown effective, other respected business education programs may make a shift towards this method.

Education has been increasingly influenced by technology, as technology has become cheaper and more accessible. Classrooms today are often equipped with projectors, audio and visual equipment, and computers. Introducing technology into classrooms has been shown to improve engagement, aid in research, and open communication opportunities (Instance & Kools, 2013). Professors are likely to continue exploring ways of using technology in their classrooms to improve educational outcomes.

The Studio at Copenhagen Business School (CBS) is a new classroom space that lies at the intersection of the shift towards studio education and the increased influence of technology. The sponsor of this project, Stefan Meisiek, heads the studio program, which has been teaching the ‘soft skills’ for the past two years in a converted house with minimal classroom technologies. The success of the Studio at CBS has led to an expansion into a new space in June of 2014, which provides an opportunity for technology to be implemented. Our goal was to identify and propose information communication technologies (ICTs) that, if used in the Studio classroom, will improve the education of tomorrow’s managers and leaders.

## Chapter 2: Background Research

This project lies at the intersection of business education, studio learning, and the use of technology in classrooms. This chapter establishes baseline knowledge on these topics, as well as information that pertains to our methodology of evaluating the effectiveness of the technologies. This background section will begin by covering fundamental knowledge on business education to better understand where the foundation of business education lies. Section 2.1 addresses the goals and challenges of business education, and Section 2.2 discusses the history and details of Studio Learning. Section 2.3 describes how the Copenhagen Business School has adopted studio education in their effort to educate management more as a craft. The final subsection examines the ever-increasing presence of technology in education and the role it plays in a learning environment, including the Studio at CBS.

### 2.1 Business Education

The goal of a business education is to prepare students to solve a multitude of problems they may face in the business world. As described in *The Cambridge Business Review*, “the pivotal objective of teaching business studies at higher education level is enhancing and updating the knowledge and capabilities of students to meet the challenges of time.” (Ali, 2008). Students need to be equipped with the problem solving tools, interpersonal skills, and domain knowledge to solve real-world problems. After Enron’s well-publicized collapse in 2002, and the 2008’s global financial collapse, business schools have placed a greater emphasis on ethical decision making in business curricula (Archer, 2004). This has led to a revolution in business education, with many innovators seeking out new methods to improve the current business education model.

### 2.1.1 Business Education as a Craft vs Science

ESCP Europe was the first school established for the purpose of business education. The school was founded in Paris, France in 1819, and it commenced the founding of a multitude of other business schools. The Harvard Business School changed business education in 1908 by being the first institution to offer the Master of Business Administration degree. Due to there being no curriculum at the time for a Master's program, the faculty at Harvard came up with the Case Study Method (CSM) (Rebeiz, 2011). In a CSM classroom, instructors present students with a problem (referred to as a case study) that they must analyze outside of class, both individually and in a group. The professor then spends class time facilitating discussion between the students, often calling on various students at random. The discussion is fast-paced, and debates between students are frequent and encouraged.

Business education pedagogy changed midway through the 20th century. Professors taught business as a craft before this time period with education methods such as the CSM, which promotes first-hand experience of business problems. Due to an increase in research in business education, many professors started to consider business as a science of organization, incentivization, and maximizing profits and efficiency. Professors began to take a scientific approach to teaching, using methods found in other disciplines, such as engineering, to guide business education. "The scientific paradigm assumes that information is objective and that its meaning is clear and definitive." (Bailey & Ford, 1996). This paradigm implies that there is a correct answer to every problem. Professors taught students how to arrive at correct answers through analytics and models. This method, efficient at maximizing profits and efficiency, was prevalent for the second half of the 20th century.

Business education once again transformed around the turn of the 21<sup>st</sup> century due to fewer people viewing business education purely as a science (Bailey & Ford, 1996). Bailey and Ford proposed that “designing business curricula to reflect the central role of action, rather than scientific analyses” would provide a better management education system (Bailey & Ford, 1996). Treating management education as a craft, yet integrating scientific methods, would allow for a more effective education.

### 2.1.2 Business Education Issues

The recent economic collapse of 2008 can be partially attributed to the failures of the current prevailing business education model. The failures of the current approach to a business education were starting to show even before the collapse. In a lecture hall, the required problem solving and ethical evaluation skills are difficult to teach properly. Other topics are emphasized, such as maximizing profits and shareholder value within a company. With little education in processes that include teamwork, strategic planning, and leadership development, graduates are going on to make decisions that improve profits in the short term at the expense of long-term stability. Business students would be able to practice these key skills in a studio classroom (Taylor, 2014).

A traditional lecture-based business education does not adequately get students involved with real-world cases in order to develop their skills and apply acquired knowledge. In order to develop professional skills, business students should not only address case studies and learn in a lecture hall setting, but also be working together on projects. Students can be better prepared for the business world by using the latest technologies and working with businesses on real projects (Ali, 2008). Again, these educational outcomes can be met within a studio environment.



### 2.1.3 Non-ICT Business Education Improvement

Business education outcomes could be altered by making a few simple changes, which many consider to be beneficial. Having group discussions introduces students to considering many points of view before forming a plan of action. Changing the discussions into debates helps develop critical thinking and rhetoric skills that will be important in leadership positions within businesses (Ali, 2008).

Class size is a common issue among many academic disciplines. It is hard to have a hundred students in a lecture hall develop the practical skills that will be crucial in a business environment. By shrinking class sizes, student-to-student and student-to-teacher interaction will increase, thus increasing the time for activities that allow skills to develop. Additionally, changing to a studio classroom will allow for a broader range of activities that can develop more specific and relevant skills. Shrinking class size does come at a cost, however. Fewer students per professor results in an increase in professors needed to teach the students. The required number of instruction space increases as more professors are added.

## 2.2 Studio Learning

Universities have used studio learning for centuries in art and design education, and educators are just recently exploring a design and craft-based pedagogical approach for business education as well. At its core, studio learning is an educational model that turns a classroom into the closest possible representation of the environment that graduates will experience as professionals. Facilitators of studio classes set up their learning environment with furniture that can easily be moved around to support multiple types of classroom activities, such as presentations, discussion, and group work. Experiential and project-based learning characterize

these activities that take place in studio education. Multiple case studies report that studio learning suits more individual learning styles, increases knowledge retention, increases student satisfaction and engagement, and helps students meet course outcomes (Majhi & Modi, 2012).

### 2.2.1 The Studio Classroom

In its simplest form, a studio classroom is any room that is capable of changing to suit the activity of the day (Lynch & Markham, 2003). In art education, this means a professor can turn the classroom into a lecture-style space where students can watch him demonstrate a principle, or into a workspace where students have access to all the materials they need to work. Professors could even turn the classroom into an exhibit space to allow students to critique each other's art (Hetland, Sheridan, Veenema, & Winner, 2013). Activities in a business studio include discussing case studies, working in small groups on a design problem, or presenting solutions to the class. The people in the studio and the space itself have to encourage inquiry, discussion, and learning by doing. This responsibility falls on the professor leading the class, the students, and the equipment and room itself (Barry & Meisiek, 2014, forthcoming).

### 2.2.2 Benefits of Studio Learning

Recent attempts to transition business and engineering curricula to a studio model have yielded improvements in multiple educational outcomes, such as increased student engagement and collaboration. Students became better problem solvers within their discipline because they were able to immediately engage in a discussion with their professor (Majhi & Modi, 2012). Teachers judged student learning progress more effectively when they were in the room engaging one-on-one with students (Majhi & Modi, 2013; Hetland, Sheridan, Veenema, & Winner, 2012). The studio model encouraged discussion among students, allowing them to

develop their critical thinking, presentation, and argumentative skills (Hetland, Sheridan, Veenema, & Winner, 2013).

The studio classroom improves student- to-teacher interaction compared to a lecture classroom. In a lecture based environment, professors have little ability to engage with students beyond the occasional question asked in class or in office hours. In a studio environment, students are able to ask questions without interrupting the learning of others. In addition, a student is more likely to feel comfortable asking a question one-on- one with the teacher than in front of the whole class (Hetland, Sheridan, Veenema, & Winner, 2013; Lynch & Markham, 2003).

Professors can create more precise evaluations of students in a studio environment. In a traditional lecture hall, a professor is mainly able to judge a student based on his or her exams or projects. However, exceptions to this are lectures small enough to organically encourage conversation and case study discussion rooms. A grader is only able to indirectly dissect and judge the students' thinking and problem solving abilities. The student is only able to get feedback in the form of one or two sentences from the grader, as the task of evaluating many students often burdens professors. The indirectness and brevity of feedback makes it difficult for students to understand where they are going wrong in their processes (Hetland, Sheridan, Veenema, & Winner, 2013). In a studio environment, the professor can directly observe a student solving a problem and is able to give individual, in-depth, immediate feedback. This helps students quickly learn problem solving methods that apply to the discipline (art, business, etc.). These interactions also enable students to learn domain-specific vocabulary that will help them going forward in the field. Hetland *et al* characterize studio learning by a professor's ability to wander the classroom and find "teachable moments" that help students immediately

improve their problem solving skills and better direct them towards success with the goals of the activity (Hetland, Sheridan, Veenema, & Winner, 2013).

Studio classrooms also increase student collaboration and discussion. There is little to no interaction among students during a traditional lecture, which limits collaborative learning to ad-hoc meetings outside of the lecture hall. This essentially randomizes the outcome of any student-to-student interaction, and does not allow a professor to assist in guiding the discussion towards the goals of the course. In a studio environment, the instructor encourages discussion by turning the classroom into a forum or exhibit. An exhibit enables students to discuss their work in small groups, while developing their presentation, rhetorical, and critical thinking skills. Alternatively, professors and students can arrange chairs into a circle to create a forum style discussion where the professor guides topics and questions to ensure that everyone is involved and attempting to reach their educational goals (Hetland, Sheridan, Veenema, & Winner, 2013).

The intimacy and openness of a studio classroom enables students to tailor their education experience. Individual learners have the ability to move to a quiet space and work away from potential distractions, whereas students who desire collaboration can gather around tables or move their chairs together to talk and share ideas. Professors can wander the room and identify student needs and provide resources and instructions tailored for the individual (Armarego & Fowler, 2005). It is important to note that some activities will not allow for individual choice; such as group discussions or strictly individual work.

Studio learning increases student-to-student and student-to-teacher collaboration, in addition to fostering creative thinking and problem solving skills. Teachers and professors spend their time guiding discussions, asking directed questions, and helping students. The facilitator watches students as they solve problems, which improves the quality of student assessment. The

smaller, intimate environment created in a studio classroom caters towards more types of learners than traditional lecture-based education.

### 2.2.3 Drawbacks of Studio Learning

Studio education's gains can come at a cost. Professors need to spend more time planning activities, and need more experience to fully utilize the benefits of the format. Studio project planning requires more forethought and needs to be adaptable. It is also hard to maintain a student-to-teacher ratio in studio education as high as in lecture-based education. The facilitators in studio settings need to address all of these issues.

Studio education is a more in-depth educational approach than lecture in the sense that it requires more participation from both teacher and students. Each session needs to be precisely planned and prepared, as the class is based around activities instead of lectures. This includes planning the precise layout of tables, chairs, and other equipment in the room and then moving the equipment before class (Sawyer, 2012). It is likely that some professors might not want to spend the time planning and setting up multiple classroom designs, or they might not have the expertise to create an ideal setup for an activity. Future studio professors can be trained in a preparatory course, or by sitting in on an existing studio class and taking notes on classroom design. Staff can share popular classroom designs and activities to minimize logistical overhead.

The longer, multiple class period projects that are common in studio classrooms also require more planning. Faculty need to design projects to incorporate checkpoints that line up with the course schedule; meaning that a class that meets daily will need different checkpoints than one that meets weekly. These projects should be able to produce 'teachable moments' of failure that trigger discussion and reflection. A project that is too difficult will likely discourage

students and possibly lead to a competitive atmosphere. A project that is too easy will not require students to struggle or follow unique problem-solving approaches. The perfect studio project has enough constraints to encourage critical thinking and various ‘out-of-the-box’ solutions to a problem, but is not so constrained as to force all students towards one answer. Planning these sorts of projects takes not only time but also experience with student behavior that many professors might not have (Sawyer, 2012). Technology in the classroom should support the constraints and challenges set up by professors instead of removing the challenges and taking away from the students’ educational experience. Sharing of course materials and projects among professors can again simplify the process for instructors. Reflection on the successes and failures of lessons would help teachers make refinements for the future.

One of studio learning’s goals is to encourage failure that will lead to ‘teachable moments’. As mentioned earlier, planning activities that will create these teachable moments can be a burden for teachers. It is possible that few of these moments will occur in a well-designed activity. A studio classroom is organic and random, meaning there is always a chance that students won’t create the intended failures that lead to a discussion. Experienced professors will be better at organizing activities more likely to create these situations, but making sure that students are reflecting on their work also requires vigilance on the professor’s part (Sawyer, 2012).

Studios are less efficient in the education of large numbers of students. A lecture hall can fit hundreds of students and a single professor, but a studio classroom requires a much lower student-to-teacher ratio to reap the full benefits of the model. Most current examples of studio classes have less than 40 students and one professor (Meisiek, 2014). This ratio raises the cost of education per pupil, as well as the space requirements. In addition, students are interacting

directly with classroom materials in studio classrooms, instead of simply writing notes in their own notebooks in a lecture hall. These materials require a further raise in funding (Meisiek, 2014, Sawyer, 2012).

A final disadvantage of studio learning is that the model is new to many professors. Professors emulate behavior, mannerisms, and teaching style from their teachers. Many professors would be less comfortable in a studio classroom if they experienced graduate school in a lecture hall with an advisor. Professors are not likely to easily identify the best practices in a studio classroom until they spend significant time teaching in one. This could impact student performance in the classroom and irritate professors who might be uncomfortable in a different environment (Sawyer, 2012). A university with studio classrooms could implement a training program that includes professors sitting in on an existing studio classroom and learning the teaching style.

## 2.2.4 Current Examples of Studio Learning

### 2.2.4.1 *City University of Hong Kong*

In 1997 the City University of Hong Kong implemented a model of education in their Physics department. This involved students teaching other students course material in a studio environment illustrated below in Figure 1. The space held 60 students, and the instructor divided the class into six groups of ten. The instructor distributed the students into groups based on their educational backgrounds. For each studio session there was one instructor and two teaching assistants. The groups used computers, lab equipment, and video conferencing to complete their work (Stokes & Yu, 1998).



Figure 1 - The Classroom Setup (Stokes & Yu, 1998)

The instructor delivered course material in a traditional lecture classroom using overhead transparencies, computer displays, and laser disks. Groups then broke off and worked towards completing physics problems. The class would gather together after about half an hour, where a representative from each group would present their solutions and the processes they used to obtain this solution. The professors asked students about their opinions on the change of learning, and Table 1 displays the results.

Table 1 - Small Groups Project Result (Stokes & Yu, 1998)

Students who said it was easier to ask questions and express their ideas as opposed to traditional learning	77%
Students who have more confidence to approach the teacher and express their ideas to the teacher	54%
Students who think studio learning shows them a different way to think	62%
Students who said that studio learning was student centered instead of teacher centered	56%



In addition to these positive outcomes, the study found that students were more comfortable asking their peers for help. Teachers found that being present while teams work allowed for more direct feedback and as a result they could better help students.

A challenge that arose was designing the course to help ease the transition for the students from traditional learning to the studio classroom. “In order to switch from the traditional teaching mode to the ‘students teaching students’ mode, the instructor needs to invest significant time and effort in careful design and scheduling of the different activities within a session.” (Stokes & Yu, 1998)

#### *2.2.4.2 Murdoch University, Australia*

Murdoch University in Australia has recently started implementing studio learning in their undergraduate engineering programs. They started the transition by having third and fourth year student’s experience studio learning and then evaluating the effectiveness of the method. Everyone besides international students found it easy to transition to the studio classroom environment. Another key finding was that students were more successful when they identified their individual learning styles and tailored their experiences to suit. This is possible in a studio setting as visual learners are able to go through different material than their peers without using everyone’s time. Likewise, teachers were more successful when they catered to students’ individual learning needs (Armarego & Fowler, 2005).

Based on the positive results, the university plans to continue implementing studio learning in more parts of the curriculum. Murdoch University hopes to improve students’ project management, problem solving, group work, and communication skills through the increased studio time (Armarego & Fowler, 2005).

#### *2.2.4.3 Indraprastha Institute of Information Technology, India*

Indraprastha Institute of Information Technology in New Delhi, India implemented an undergraduate Software Engineering course using studio-based learning. The program facilitated collaboration between students by dividing them into three groups with their desks grouped in a circular arrangement. Following the conclusion of this study, the facilitators asked students a series of questions regarding their opinions on studio-based learning. The study's results found that over 70% of students thought they had a better understanding of the concept and over 55% of students had an increase in motivation. Additionally, the results showed that in large classroom settings, there was an increase in instructors' work and more faculty may be required (Chaudhary, Gupta, Sarkar, & Sureka, 2013).

#### *2.2.4.4 Summary of Current Studio Implementations*

Studio Learning is a method of teaching that has been used and proven to enhance participation and motivation. These examples show how studio education has been successfully implemented at various schools. The knowledge gained from these examples provides a better understanding of the work at the Studio at CBS.

### **2.3 The Studio at CBS and its Goals**

Copenhagen Business School adopted the studio approach in 2010 with the creation of the Studio to assist in teaching business as a craft. Understanding the goals of the Copenhagen Business School as a whole, as well as its studio specifically, is valuable in order to make informed decisions on ICT solutions for the Studio at CBS. This section explores the current standing of CBS and discusses the mission of the Studio.

### 2.3.1 Copenhagen Business School

The Copenhagen Business School, located in Frederiksberg, is one of the largest business schools in Europe. It is a state-funded institution that offers a wide range of programs from business to business-humanities hybrids. CBS offers undergraduate, graduate, and PhD levels of study. The institution was recognized as the third best business school in the world by Eduniversal, a ranking and rating agency that focuses in higher education. The International Business Review also acknowledged the school in 2006 as second in the world for International Business. CBS was also awarded the 5 Palmes rating, which means it is one of the top 100 Universal Business Schools that influences educational internationally. Additionally, International Recruiters ranked CBS as seventh in the top 10 European business schools (Accreditations & Rankings, n.d.).

### 2.3.2 The Studio at Copenhagen Business School

The Studio at the Copenhagen Business School is a converted villa (see Figure 2) dedicated to interactive learning which can host a class of roughly 40 students. The Studio is a classroom space that promotes hands-on learning and is meant to compliment the classroom pedagogy (Meisiek, 2014). This space encourages experiential, problem-based learning about issues faced and strategies used in the business world. The Studio aims to be “a place where CBS teachers and students can work with processes like tangible business modeling, dramaturgic approaches to organizational behavior, visual and haptic design of organizations, strategies, and business processes, creative explorations of innovation and change, and much more.” (Studio@CBS, n.d.).



*Figure 2 - Current Studio Building*

Professors choose the Studio as their classroom because they want an interactive style teaching environment. Any organization or person can book the Studio for a course, workshop, meeting, or summer school. Facilitators host activities in the Studio that allow students to work on real-world projects or challenges. Figure 3 shows the atmosphere in the studio; it helps promote creativity and innovation. Students also use the space to lead their own workshops (Meisiek, 2014). The studio is open for use by all students, including MBA and PhD students (Studio@CBS, n.d.).



*Figure 3 - Inside the Studio at CBS*

Within the next year the Studio will be moving to a new building. The new space is an old computer lab that can hold 80 people, which is twice the amount of the current space. Figure 4 depicts the current state of the new studio space, but Stefan plans to install moveable walls or curtains to create a more flexible space. Both the new and current studio spaces are equipped with wireless internet which is beneficial because most students bring a laptop and a smartphone to class (Meisiek, 2014). This new space will enable the Studio to expand from a simple classroom to an interactive learning classroom.



*Figure 4 - Current State of New Studio Location*

## 2.4 Technology for Education

While business education is experiencing a shift towards craft and design, education as a whole is experiencing a significant shift towards the implementation of technologies to benefit the learning environment. In recent decades, technology has been advancing at exceptional rates, and this shift in education can be traced back to scholarly articles and research papers written as

early as the 1960s (Tondow, 1961). In order to better understand why information communication technologies should be implemented into the Studio at CBS, it was valuable to understand the impact this sort of technology has had on education in recent history, while also clarifying any issues surrounding this topic.

The first subsection explores the impact of technology on education as a whole, including its impact on the educational content, and the drawbacks of technology's presence. The second subsection discusses the impact technology has had on studio education specifically. This subsection concludes with a brief description of the current role of technology in the Studio at CBS.

#### 2.4.1 Technology in Learning Environments

The idea of bringing technology into the classroom is not new. In a 1961 article, Tondow explored the idea of replacing professors or teachers with computer units as a way to increase the efficiency of teaching. He explains the effectiveness of control units in terms of branching and fixed sequence programs, as well as using the units for methods of reviewing content for the students (Tondow, 1961). In the 60s, the implementation of technology into learning environments focused on automation, but that has since changed in the fifty years of technological innovation.

In the new millennium, the focus of technology in education has shifted towards using ICT's to further innovate pedagogies, as well as utilizing it as a supplement for education, rather than automating the process. A volume from the Organization of Economic Co-operation Development (OECD) regarding innovation in knowledge states that there are four 'pumps' for innovation in organizations: modular reorganization and specialization, utilizing research and

development to its potential, the communication of knowledge beyond traditional limits, and exploitation of different technologies as well as technological advance (Edwyn, 2001).

Instance and Kools argue that technology does not have a single effect on learning environments; rather, they ensure that technology contributes to multiple components. For example, technology may change who the “learners” are in a learning environment by introducing formerly excluded learners or by bringing people from around the globe together into a community of learners (Instance & Kools, 2013). Additionally, technology may alter the “teachers”, such as the implementation of on-line or automated tutors. The ability to chat via text with an Apple Genius on the Apple website essentially creates a small learning environment in which an expert (the ‘teacher’) educates the consumer (the ‘learner’) on any subject with which they need assistance (Contact Us, n.d.).

#### *2.4.1.1 The Impact of Technology on Education Content*

The use of technology can significantly change the content of education. Many computer programs or applications expand student understanding by assisting in the visualization of abstract concepts using techniques that textbooks or recitation are unable to achieve (Chesnek, 2001). Computer aided drafting is an example of how innovative programs assist in visualization where traditional methods cannot; drafting in three dimensions is more difficult on two dimensional paper.

The implementation of ICT innovates the dynamics of content presentation. For example, rescheduled learning is a process where students are able to access information from the teacher at a more convenient or preferable time, through video recordings of lectures or automated tutors (Instance & Kools, 2013). Time is more flexible with the concept of rescheduled learning, which complements the varied learning tendencies of a student body.

Educational philosophies also support attempts to “break down the notion that learning has to take place in a fixed place and at a fixed time.” (Instance & Kools, 2013).

#### *2.4.1.2 Drawbacks of Technology in Learning Environments*

While the implementation of technologies can be beneficial to learners, there are limitations to consider. Technology can be confusing to teachers and students alike, and instruction is necessary for proper usage. Many educators feel there are “insufficient quantities of qualified new technology educators entering the instructional ranks.” (Wicklein, 2004). These mal-informed educators cannot properly teach using technology without wasting time and effort by incorrectly using these tools that are meant to enhance learning.

If professors and students improperly use technology, they start to distrust the use of ICT for learning. According to a past IQP, students do not like the addition of unfamiliar ICT solutions, such as e-portfolios, at first (Gutierrez, Ketschke, Lextrait, & Rosen, 2011); however, the students were able to grow accustomed to the new technology and benefit from it. These results illustrate a concern explained in a 2001 report for the OECD that must be addressed to ensure quality in ICT-enhanced learning: “Digital literacy is now a fundamental learning objective for all.” (Edwyn, 2001, p. 16). Edwyn explains that, just as the ability to read is a required skill in order to read along with lectures, technological activities require technological literacy (Edwyn, 2001). If this requirement is not addressed, the distrust of technology will accumulate over time, and the professors or students will stop using the technology.

While ICT can enhance aspects of the studio learning environment, implementing them may serve as a distraction to the learners. The team interviewed a Worcester Polytechnic Institute professor experimenting with non-traditional teaching styles who decided to upload lecture videos on YouTube so that class time could be spent on more experiential activities and



individual learning exercises. The professor experienced some complaints from students that YouTube's suggested videos would draw them away from the material; however, the professor used YouTube as an alternative to the Coursera online teaching program which students find unfamiliar. As explained earlier in this subsection, students do not resonate with unfamiliar programs. For this reason, the type of ICT solution implemented in non-traditional pedagogies should strike a balance between familiarity and engagement.

### 2.4.2 Technology in a Studio Learning Environment

A large aspect of studio learning is the individualized, hands-on learning that takes place within the studio. A studio-influenced pedagogy enables students to define their own education by creating personalized programs to achieve goals, utilizing the collaborative aspect of group dynamics, and taking on the responsibility of individual roles. ICT solutions are highly practical in enhancing these aspects of studio education (Instance & Kools, 2013).

ICT in a studio learning environment can facilitate interaction within a group in a way that traditional learning does not allow. An example of this type of ICT is the NRICH website; NRICH is an online tool for teachers and students to incorporate tasks and miniature projects into the classroom. It is designed to enrich the mathematical experience with activities that are not typically practiced in a traditional learning environment (About NRICH: Project Aims, n.d.). These activities are better aligned with those practiced in a studio environment. Within only a year of familiarizing themselves with the NRICH website, teachers found that noticeable changes had taken place: ““(The) department is now more willing to try puzzles out as a part of their teaching’ and ‘more peer interaction’.” (Jared, 1998, as cited in Monteith, 2004, p. 63) This example reflects another interesting detail: the faculty themselves felt more willing to try different teaching methods after the NRICH website was implemented. The faculty at CBS may

follow this same pattern if the Studio is well-equipped with beneficial ICT solutions.

Being connected to the internet provides access to communication that is not limited to one's current location. This communication is valuable to the collaboration and group dynamics experienced in studio space. According to Instance, technology builds and supports widening partnerships, "through forging alliances, partnerships and networks, while extending the environment's boundaries, learning spaces and resources." (Instance & Kools, 2013). The internet extends the environment's boundaries and learning spaces by providing access to countless conferencing programs and social media websites for students to keep in contact with each other outside of the classroom.

#### *2.4.2.1 Technology in the Studio at CBS*

The Studio at Copenhagen Business School desires these benefits from the implementation of ICT. Currently, the level of technology in the Studio is very low. The students visualize information through the use of whiteboards, flipcharts, post-it notes, or construction paper. The Studio's current use of technology is limited to students' personal technology (laptops, smartphones, etc.) and large TV screens with VGA cables. Stefan Meisiek, the head of the Studio program at CBS, believes that there is room for improvement through the use of ICT (Meisiek, 2014), and the information presented in this section supports his belief.

## Chapter 3: Methodology

The goal of this research was to identify ICT hardware and software options that will aid professors in teaching courses in the Studio at the Copenhagen Business School. The outcome of this project is a formal proposal, created to account for the different opportunities for technological improvement in the Studio. The proposal consists of the top one or two solutions for each opportunity for technological improvement, as well as a list of the five overall most effective solutions. The sponsor will consider the proposal as the Studio moves to a new space in June 2014.

The team established the following objectives to meet the goal of the project:

- Understand the current state of the Studio and the courses currently conducted within it.
  - Gather suggestions of technologies from students and faculty, and identify technological opportunities.
- Distill collected data into technological suggestions, technological opportunities, and constraints.
  - Identify criteria by brainstorming after distilling data.
- Research potential ICT solutions.
- Analyze and assign scores to the potential ICT solutions.
- Validate the top ICT solutions with Studio faculty.
- Organize top ICT solutions into a detailed proposal.

The calendar in Appendix A describes the timeframe by which the team met these objectives.

## 3.1 Collection of Data

Bringing business education to a studio environment is a recent idea. There is little information on specific technologies that can enhance a studio classroom focused on business education. Therefore, this methodology starts with the collection of data from relevant faculty and students to determine technologies that can improve the Studio at CBS. Interviews with studio faculty provided suggestions of ICT solutions and established a list of general problems that need solving. Class observation and conversation with students during classes at the Studio were methods that helped establish the current state of the Studio's courses and technology.

### 3.1.1 Faculty Interviews

The opinions of the faculty using the Studio were at the forefront of the decision making process; they had the experience to know what technologies are most needed in the Studio. Professors who have previously used the Studio also have valuable input into what technological opportunities exist. These technological opportunities guided research of individual ICTs that could address them. Surveys are not ideal for getting this sort of qualitative data, and focus groups would likely get off topic, or focus on one specific issue instead of generate a list of issues. Therefore, interviews are a preferred method to get the in-depth expert opinions from the professors.

Appendix B includes a standard template for interviews. Questions 1 and 4 are examples of questions designed to create a conversation that generates a long list of useful information. The answers to questions 5 and 6 gave an idea of the general problems of the Studio, while questions 3 and 7 yielded specific technology suggestions.

Stefan Meisiek identified six faculty members who were either involved with the Studio or were related to its goals. Appendix C lists the interviewees in alphabetical order and relevant information regarding their positions and experience with studio education.

The first of these interviews was with Rob Austin and Shannon Hessel; the former is a professor at the Copenhagen Business School who is a published expert on using technology in classrooms, and the latter is a previous user of the Studio with experience in theater. While Austin's research does not focus specifically on Studio classrooms, his insight and answers to the questions presented in Appendix D were valuable for the project. Appendix E contains a custom interview script for Shannon Hessel that addresses her experience in theater and how set design could influence technology suggestions. Another interview was with Balder Onarheim, who provided insight from the perspective of a long-time user of the Studio.

Both Karl-Heinz Pogner and Lena Mygdam Zwisler have yet to teach a course in the Studio, but are familiar with it and plan to teach in it soon. Appendix F consists of questions that are more relevant to these professors who have not yet facilitated activities in the Studio. Similarly, a CBS professor (who wishes to remain anonymous) provided additional insight from the perspective of someone who had taught in the Studio but decided to not return. The intent of these interviews was to gather data that would entice more professors at CBS to use the Studio.

The next step in the interview process involved seeking out the expert opinion of David Dunne, a faculty member of the University of Toronto. David established a classroom similar to the Studio called RADIUS, and his experience with studio education is valuable for the project group.

It was most effective and time efficient to have two team members at each interview. One person led the discussion with the interviewee and asked questions, while the other took notes. To ensure that no content was missed in the notes, a phone application recorded the interviews with permission from the interviewee.

### 3.1.2 Classroom Observation

The ICT solutions need to be true to the spirit and goals of the Studio to ensure it maintains the benefits that studio learning provides to the students. Sitting in on classes taking place in the Studio provided insight on the atmosphere and any aspects of the activities that would be valuable to keep. If the faculty member gave team members permission, pictures became a reviewable reference for how students learn and interact in the Studio. Pictures also helped in reviewing the notes for clarity and ideas.

To guarantee that no detail was missed in the visit, two team members were present for each class. The sheet presented in Appendix G displays the format of the class observation notes; the goal was to describe the activities taking place, identify the equipment (technological or non-technological) used, and list any technological opportunities. Visiting classes also provided a chance to identify constraints like the size of the classroom, the size and nature of the activities, and the learning outcomes of the class.

Visiting and observing Studio classes gave the most information on the nature of the activities in the classroom. The information on the activities, any potential constraints, and other various notes made it easier to propose technologies that will be relevant to the Studio as it moves into its new space.

### 3.1.3 Student Conversations

Classroom visits sometimes presented opportunities to speak with students. Talking to students proved to be a more direct method of determining the nature of Studio activities, and helped provide constraints needed to consider during the analysis phase. Students often had suggestions of technological opportunities and specific technology suggestions. Appendix H lists possible conversation starters aimed to create brief, informal dialogues with a student or group of students.

With professor permission to talk to students, conversations were started by introducing the project to a group of students. The conversation continued if the students were comfortable giving up a few minutes of their class time.

### 3.1.4 Visiting the New Studio Space

The next step in the collection of data involved visiting the space that the Studio will occupy in the near future. The Studio will be moving to a new location in June 2014. The proposed technology solutions will be implemented in this new space. It was therefore important to fully understand the layout and characteristics of the new space to ensure that the proposals satisfied any inherent spatial or technical constraints.

The sponsor took the team to visit the new space so that the team could take pictures, notes, and measurements, as referenced in Appendix I. The shape and layout of the space was supposed to be captured by pictures taken during the visit. Unfortunately, construction had not yet begun; the room was in its previous layout as a computer lab.

The team sent two members to meet with Stefan and the Studio's architect, Siv Britt Mansa, about the planned layout for the new Studio. Due to the team not being able to meet with any IT personnel, the architect was able to talk briefly about any electrical constraints of the

Studio. The team also obtained a proposed blueprint of the space, in case there were any features of the design that might influence the proposal.

## 3.2 Distillation of Data

The data collection described in Section 3.1 produced a large amount of raw data that required distillation into useful points to drive the research. The team decided on using an open, deductive coding approach to distillation due to the varied types of data collected (Burnard, Gill, Stewart, Treasure, & Chadwick, *Analysing and Presenting Qualitative Data*, 2008). With knowledge from the background research in mind, the team decided that the most useful categories to achieve the goal are technological opportunities, suggestions of ICT solution types, and constraints.

The team reviewed notes taken from interviews, class observations, conversations, and the visit to the new Studio with the open coding approach to place all of the raw data into the three categories. The notes also proved to be useful in identifying criteria that would later aid in evaluating researched technologies.

The ‘technological opportunities’ category ultimately drove the research to find appropriate technological solutions. A second category, the suggestions of ICT solutions, is recommendations of certain types of technologies that the team later research for specific, individual technologies. The constraints, given by the sponsor and derived from research, guided the analysis of the possible ICT solutions by allowing the determination of the feasibility of a given solution. The final subsection describes the method of obtaining criteria, which are ratable variables of individual ICTs that can be used to compare one solution to another. The distillation of the data occurred on April 2<sup>nd</sup> and 3<sup>rd</sup>, following the collection of the data. The following sections detail the distillation process and the determination of the criteria.



### 3.2.1 Determining Technological Opportunities

The team determined technological opportunities through interviews with professors, student conversations, and class observation. This category formed a list available to all group members in a file-sharing folder. Notes from interviews, conversations, and observation served as guidance in identifying opportunities for technological improvement. Reviewing notes also provided an opportunity to identify opportunities that were not directly stated.

### 3.2.2 Gather Suggestions of ICT

Students and faculty gave suggestions for two types of solutions: specific ICT solutions that they would like implemented, as well as potential types of ICT solutions. The types of ICT solutions were not specific technologies, but were instead suggestions of a category of technology that can encompass multiple specific solutions, such as a 3D printer. The team later broke down these types of ICT solutions into specific, individual ICT solutions.

The next step in the process consisted of reviewing the notes and adding ICT suggestions to a list. The team took notes during distillation of which technological opportunities each ICT addressed. This work aided the evaluation process, described in Section 3.4.3. If an added ICT did not address any listed opportunity, the team brainstormed a new opportunity that the ICT would fall under.

### 3.2.3 Identify Constraints

The potential ICT solutions must be feasible and useful to be implemented in the Studio. Originally, the proposal would have included any constraints relevant to the Studio. The team identified constraints from classroom observation and viewing the new Studio space. Note that this process changed once the team removed constraints, as discussed in section 3.4.3

Classroom observation allowed first-hand observations of any barriers for potential ICT solutions. The note sheet for classroom observation includes space to write constraints noticed while observing classes.

Visiting the new Studio allowed for the creation of new constraints. The architect of the new Studio provided plans for the space; these plans included various measurements of the room, number of outlets, and noticeable geometry. The analysis of these plans provided additional constraints.

### 3.2.4 Determine Criteria

The selection process outlined in Section 3.4 calls for specific criteria to judge the ICT solutions. The team brainstormed various criteria after learning about the Studio through methods described in Section 3.1. Additionally, if the team determined that a constraint was measurable, as opposed to ‘pass’ or ‘fail’, then it would become a criteria instead. The team selected criteria that are independently measurable from one another, which helps in creating valid results (Good Evaluation Criteria, n.d.).

## 3.3 Research Potential ICT Solutions

The data collection and distillation phases produced usable data in the form of technological opportunities, constraints, criteria for ICT evaluation, and ICT suggestions. However, very few of the specific technologies were required for the proposal. The research phase described in this section intended to create a large list of ICT solutions. Then, the team removed redundant solutions before they moved to the analysis phase.

Each technological opportunity required research to find technologies that could address them. The primary method of research involved using web searches for the suggested ICT, as

well as browsing online for case studies where others have implemented technologies that respond to the technological opportunities. Beginning research with specific ICT solutions suggested by faculty proved to be a useful starting point for finding more technologies that satisfy the same opportunity. The team took notes according to the requirements of the analysis phase described in Section 3.4; this mainly included information relevant to the criteria.

The results found in Section 4.2 detail the creation of the criteria, but the criteria are described here, as they help clarify the discussion of the team's research methods. Price has a predetermined value, so research on the ICT can provide that data easily. Ease of use, user reviews, ease of implementation, and flexibility are qualitative data. The research produced enough information to later give a quantitative score on these criteria. After comparison with the constraint list, any ICT solution that failed to meet any of the constraints were immediately removed from consideration and no longer researched.

### 3.4 Analyze ICT Solutions

The team generated a quantitative score for each technology from the previous research. This generation of scores allowed the team to compare the different technologies. This analysis phase was comprised of three steps: assigning weights to criteria, scoring ICTs, and assigning weights to technological opportunities. Faculty invested in the Studio at CBS provided the weight and importance of each criterion using a pairwise comparison chart. Then, Stefan used a pairwise comparison chart to determine the weights that should be given to each opportunity. Lastly, the team scored the ICTs in a decision matrix, using the weights gathered from the faculty. This section discusses these three steps in detail.

### 3.4.1 Weighting Criteria

Section 4.2 lists the set of criteria the team used to judge the researched ICT solutions. Since some criteria were more important than others based on the goals of the Studio, it was important to assign a weight to each. Pairwise comparison charts are commonly used among professionals who use selection methods, as they are able to assemble quantitative information. Using the chart allows the professionals to create ranks or weights (Dym, Wood, & Scott, 2002).

Eventually, the team used the weights established from this chart to score individual technologies. Thus, only those experienced with the goals and needs of the Studio identified the importance of criteria. Originally, the team was only going to consider Stefan Meisiek's input, but he was unavailable due to an illness at the time. Instead, the team sought the opinions of other Studio faculty (Daved Barry, Steven Taylor, Shannon Hessel, and Balder Onarheim). By the time all of these professors had filled out the pairwise comparison, Stefan was available, and also completed the chart. Instead of throwing out the data gathered from other professors, Stefan's opinions counted for half of the weight, and the average opinion of other professors made up the other half. Table 2 below displays the pairwise comparison chart used for this analysis, including the resulting criteria that the team determined according to Section 3.2.4.

Table 2 - Criteria Pairwise Comparison Chart

Criteria	Price	Size	Ease of Use	Ease of Implementation	User Reviews	Flexibility	Reliability	Aesthetics	Total
Price									
Size									
Ease of Use									
Ease of Implementation									
User Reviews									
Flexibility									
Reliability									
Aesthetics									

For each chart, the team multiplied each criterion's total by a weight based on who the faculty member was. If the faculty member was Stefan, the head of the Studio and the sponsor of the project, the weight had a value of half of the total score, or .5. For other faculty, the weight had a value that was the remaining half of the total score divided evenly. There were four other professors who filled out the chart, each with a weight of .125. The Excel spreadsheet performed three steps to reach the criteria weights included in the decision matrix in Section 3.4.3. The first step was to sum each of the weighted criteria together to get the average total weight for each criterion. The next step involved dividing these totals by the sum of all the totals to give a relative weight. The final step occurred in the decision matrix; the matrix multiplied these relative weights by 20, in order to result in a technology score with a range of up to 100, as described in Section 3.4.3.

### 3.4.2 Assign Weights to Technological Opportunities

The importance of each technological opportunity is also relevant to the proposal. To determine this importance, Stefan filled out a second pairwise-comparison chart to assign weights to the technological opportunities. As director of the Studio, Stefan's insight held

particular value to the evaluation of which opportunities were most important to address. Table 3 shows the chart which includes placeholders for the possible technological opportunities.

*Table 3 - Technological Opportunities Pairwise Comparison Chart Example*

Technological Opportunities	Opportunity 1	Opportunity 2	Opportunity 3	Opportunity 4	Opportunity 5	Opportunity 6	Total
Opportunity 1							0
Opportunity 2							0
Opportunity 3							0
Opportunity 4							0
Opportunity 5							0
Opportunity 6							0

The scores from the “total” column represent the weights for each technological opportunity. The team followed a similar process as that in Section 3.4.1. Each opportunity’s total score was divided by the total score, resulting in a percentage-based weight.

If an opportunity received a zero score, it would result in that opportunity having no effect on the overall scores that were calculated in Section 3.4.3. Any technology that only satisfies this opportunity would receive a score of zero, which prevented several technologies from even being considered for the overall top solutions. The team increased all of the opportunities’ totals by one to add effect to the opportunities that received a score of zero. The scores for other opportunities also increased by one to preserve the balance of importance identified by Stefan.

These weights multiplied with the scores in Section 3.4.3 to aid in getting the overall scores of each individual technology. Section 3.6 describes how these weights are valuable to find the top five solutions for the proposal.

### 3.4.3 Assign Scores to ICT Solutions

The proposal requires the identification of a ‘best’ solution for each technological opportunity. Decision matrices, external decision, multi-voting, and prototyping/testing are all

common methods used to choose between solutions to problems (Ulrich & Eppinger, 2008). Decision matrices are preferred for this project since they remove bias from decision-making, and time did not permit implementing and testing each technology (Tague, 2004). Tables 4 and 5 display the decision matrices designed for this project.

The scoring process for each technology needed to consider the performance towards each criterion and constraint. The matrix in Table 4 provided space to score technologies for criteria, and to put a checkmark for constraints that a solution met.

*Table 4 - Original Decision Matrix*

		ICT Solutions				
		Solution 1	Solution 2	Solution 3	Solution 4	Solution 5
<b>Constraints</b>						
Constraint A						
Constraint B						
Constraint C						
Constraint D						
Constraint E						
<b>Criteria</b>						
<b>Type</b>	<b>Weight</b>					
Price						
Size						
Ease of Use						
Review Scores						
Ease of Implementation						
Flexibility						
<b>Total</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

During the scoring process, it became clear that the constraints were unnecessary for choosing the best technologies. The team removed the constraints from the process, since the team kept constraints in mind during research and did not consider any technology that would have failed the constraints. Some constraints were more valuable as criteria to judge the technologies. Table 5 below shows the modified matrix that removes the constraints. This matrix includes boxes to indicate which opportunities a given technology addresses. For each

opportunity that the technology satisfied, the respective box would be marked with a '1'. If the technology did not satisfy the opportunity, it was filled with a '0'. The team decided the marks through group discussion after researching the various technologies. The Excel Spreadsheet then summed the weighted scores for each technology, which resulted in a total score for technological opportunities covered. This total and the total criteria scored later multiplied to create an overall score. This helped generate the top five technologies for the proposal, discussed in Section 3.6.

Table 5 - Final Decision Matrix

		ICT Solutions				
		Solution 1	Solution 2	Solution 3	Solution 4	Solution 5
<b>Opportunities</b>						
<b>Problem Area</b>	<b>Weight</b>					
Digital 3D Visualization	0					
Physical 3D Visualization	0					
Accessible Sound System	0					
Communication	0					
Data Collection	0					
Data Sharing	0					
Interactive Interfaces	0					
Media Manipulation	0					
Presentation Display	0					
Recording/Class Capture	0					
Simultaneous Classroom Telepresence	0					
Sound Studio Equipment	0					
	<b>Total</b>	0	0	0	0	0
<b>Criteria</b>						
<b>Type</b>	<b>Weight</b>					
Price	0					
Ease of Use	0					
Ease of Implementation	0					
User Reviews	0					
Flexibility	0					
Reliability	0					
Aesthetics	0					
	<b>Total</b>	0	0	0	0	0
<b>Combined Opportunity &amp; Criteria</b>	<b>Total</b>	0	0	0	0	0

In order to quickly evaluate each technology, the team member responsible for researching a given technological opportunity was also responsible for assigning scores for every ICT Solution within that area. The most popular scales for scoring in a decision matrix include a



small scale of one through five, a small scale of negative three through positive three, and a large scale of 0 – 100. The precision one can have when evaluating determines which scale should be chosen (Tague, 2004). The team chose a scale of 0 to 5; 0 indicating that the technology does not address the criterion, and 5 indicating that the technology fully covers the criterion. Due to Excel spreadsheet multiplying the criteria weights by 20 in Section 3.4.1, this 0 – 5 scale allows the highest total score for a solution to be 100.

To reduce any issues of bias or difference in scoring that might have come up, a team member double checked each technology's scores. The Excel sheet multiplied these final scores with the weights of their respective criteria, then summed the values into a total criteria score in the bottom row.

The team created multiple decision matrices; one for the overall scores, and one for each technological opportunity. The highest scores in the overall matrix represent the best solutions overall. The highest scores for the individual technological opportunity reflect the best solutions for that particular opportunity.

Two of the criteria, Price and User Reviews were scored differently than the other criteria. Several prices were subscription based, while others were one-time purchases. The team decided to price every technology over two years in order to account for the different payment methods. To translate the concrete values of prices into useful data for scoring (0-5), prices were put into quintiles. An Excel sheet listed all of the prices of the solutions, and then a 0%, 20%, 40%, 60%, 80%, and 100%. Any technology that had a price between the first quintile (0% - 20%) received a score of 5. Any technology that had a price between the second quintile (20% - 40%) received a score of 4. This method was continued for all quintiles.

User reviews were available online through sites such as Amazon or EBay. These review scores were out of five, and would be directly transferred into the chart. Unfortunately, some technologies had no user reviews at all, or had only text reviews without a rating. In the latter case, a rating of 0-5 was determined at the discretion of the research. If no rating was given, the technology was given a 2.5. This was done to prevent the lack of user reviews from drastically reducing a technology's score to levels where it would not be considered.

### 3.5 Surveying for Technology Literacy Constraint

Professors in the Studio must be comfortable using the technologies selected for the proposal. This required a survey to get a large input in a short period of time, to meet a threshold of two-thirds approval for the proposal. If two out of three professors and students are comfortable using the suggested technologies, the team believes that the ICTs will be well received in the new Studio. The survey included the top technology for each opportunity, as well as a second technology if it was within 10% of the top score, since the scoring methods have a small margin of error. A brief description accompanied each technology.

The survey asked the participant to consider each technology and determine their comfort using or learning it. Each question asks for a 'yes' or 'no' answer. Unfortunately, this encouraged the respondent to go with a gut response to the technology, instead of spending time figuring out exactly how comfortable they would be.

Appendix J displays the entire survey, complete with a total of 19 ICT solutions. To keep the survey from taking more than five minutes, the team split the survey into three smaller surveys of six, six, and seven technologies. The team wrote both professor and student surveys in English, as English is the most commonly used language in courses at CBS.

To ensure that the survey was properly put together, two professors pre-tested the initial version of the survey. The team selected these subjects at random by finding the first two willing professors in offices at CBS. Having professors talk about their thoughts during and after the surveys helped clarify any issues with the structure or writing of the survey. The team addressed minor changes such as confusing word choices and grammar mistakes. Any major issues that arose from pre-testing necessitated a group meeting to discuss a solution.

Stefan suggested that email surveys for professors would not be ideal because most professors would ignore email, even if they did sincerely want to help. Consequently, the team conducted surveys in person by walking the halls of CBS buildings, asking professors if they would be interested in taking a short survey. Stefan's advice also encouraged the team to conduct student surveys in Solbjerg Plads, a central meeting area for students. Because of time constraints, the goal was to survey 25 professors and 25 students. This would provide roughly half the number of surveys required to establish a confidence level of 95% with an interval of 10 and a population of 21,000.

### 3.5.1 Studio Professor Validation

The results of the pre-tests of the initial professor and student surveys revealed that professors cared less about whether they could use a technology, and more about whether they wanted to use it. At the same time, it became clear through conversations with students, advisors, and Stefan, that students would be able to use most technologies that a professor could master. Furthermore, students who took the initial survey did not take it as intended; they looked at the picture and checked 'yes' if they liked it, and 'no' otherwise. It also took longer than expected to get only two students to take the survey. Stefan later explained that Danes have an unwritten "right to not be bothered," that made it difficult to get subjects (Meisiek, 2014). All of

these difficulties directed the team towards a different method of verifying the proposed technologies - studio professor validation.

Instead of surveying students and faculty, the project called for a new survey strategy that focused on Studio professors whom we had previously interviewed. One or two team members discussed the results of the analysis with the survey from Appendix J to help the faculty understand the ICT solutions. Studio professors had already expressed interest in helping the project during interviews, so it was easier for the team to set up conversations with them after Easter break.

The conversations worked similarly to the originally planned in-person survey, with the addition of discussing each technology with the professor. The professor was given a document containing all 19 top-scoring technologies, with a picture and description of each. A team member would introduce each technology, describe what opportunities it addresses, how it is used, and other characteristics. Professors were then given a chance to ask about the technology. Otherwise the professor would state if they were comfortable with using or learning to use the technology and also if they approved of its use in the Studio. The team aimed for half of professors to agree with each suggested technology in order for it to be included in the final proposal. Ideally, if a technology was not approved, this would call for another round of surveys with the next highest scoring technology for the given opportunity. Due to time constraints, a second round of surveying was not feasible. Instead, the proposal included a note describing the professors' concerns if any technology did not reach the 50% approval rating.

### 3.5.2 Survey Scoring

The team kept track of the approval rating in an Excel sheet, displayed in Table 6 below. The leftmost column of the table includes the highest scoring ICT solutions from the analysis phase in order of opportunities addressed, which Section 4.4 describes. The top row of the table contains the four surveyed faculty members. For every technology the survey taker replied “yes” to, that technology would receive a ‘1’ in the respective box. The sum of each technology’s scores are displayed to the right. If the score was two or lower, the technology is considered not preferred, which the “Is it preferred?” section reflects. Any of the technologies that are not preferred receive a note describing the professors’ concern in the final proposal.

Table 6 - Professor Validation Chart

ICT Solutions	Survey Takers				Total	Is it preferred?
	Stefan	Hessel	Quayle	Taylor		
SketchUp					0	No
Pirate3D Buccaneer					0	No
Cubify Cube 3					0	No
FlexCat					0	No
eBeam Engage					0	No
NearPod					0	No
SurveyMonkey					0	No
Google Forms					0	No
DropBox					0	No
Google Docs					0	No
eBeam Edge					0	No
Gimp					0	No
BenQ MW23					0	No
Epson EX 6220					0	No
Echo360					0	No
GoPro Hero3					0	No
Launchkey					0	No
Launchkey Mini					0	No
Samsung TV Cam (VG-STC3000)					0	No

### 3.6 Proposing ICT Solutions

This project required the production of a detailed proposal of ICT solutions. The proposal begins with a brief overview of the document and directions on how to navigate it. The

next pages included the Table of Contents, which lists the page numbers for each Opportunity and ICT. Each Opportunity is associated by a unique color for easy identification, which is also listed on the Table of Contents. All technology pages include a picture, brief description, bulleted information, statistics (price, reviews, website, etc.) and a list of pros and cons.

The first technologies presented are the top five overall solutions. The team determined a combined score by multiplying the total opportunity scores with the total criteria scores from the decision matrices (see Section 3.4.3). These technology pages look similar to later pages (consisting of a description, bulleted summary, etc.), but also include a list of the technological opportunities the ICT solves. If the top five list contained the same type of ICT solutions (two tablets or two 3D Printers), the lower scoring of these types did not appear in the top five. Instead, the next highest scoring technologies overall were moved up to take their place.

Following the top five are the technological opportunities and the solutions that address them. Each technological opportunity has its own page, which includes the name of the opportunity, a brief description, and the names of the highest scoring solutions. Following each opportunity page is one page for each top-scoring technology that addresses it. The highest scoring technology appears directly after the technological opportunity page, followed by the second highest technology, if it was within 10% of the first score. The team determined the top-scoring solutions for each opportunity from the total criteria scores in the decision matrices (see Section 3.4.3), since these suggestions are meant to be specific solutions towards the technological opportunities.

## Chapter 4: Data & Analysis

The final goal of this project was to create a proposal of information communication technology for the Studio at CBS that the faculty may use to recommend technological implementations. This chapter discusses the results of the team's methods to achieve this goal, as well as the results that fed into the final deliverable. The first section describes the preliminary data gathered through interviews, observation, conversation, and visiting the new studio space. Next, the distillation phase provided concrete data that drove research. The results of this research yielded an abundance of ICT solutions for the technological opportunities. The team used selection methods to evaluate the large quantity of ICT solutions and narrow down the highest-scoring recommendations. The results of the final step, the faculty validation, produced ICT solutions that translated directly into the proposal for the CBS faculty.

### 4.1 Preliminary Data

The data collection phase presented valuable insight from students and faculty. The objectives of this phase were to gather general information on the activities that take place in the Studio, the general opinions of the users of the Studio, and establish how education could be improved through technological implementations. The first subsection describes interviews with CBS professors and other experts. The second subsection discusses notes taken while observing Studio classes. Student conversations also provided the team with a variety of opinions and recommendations, as discussed in the third subsection. The final subsection addresses the visit to the new studio space.

### 4.1.1 Faculty Interviews

The team took detailed notes during each interview in order to collect a breadth of data. Appendix K contains notes from the eight interviews with studio faculty and experts.

#### 4.1.1.1 *Balder Onarheim*

The team interviewed Balder Onarheim, an external lecturer at CBS April 4, 2014. At the time, he was teaching a semester-long class in the Studio called Applied Neurocreativity. Professor Onarheim was an enthusiastic interviewee; he came to the interview with multiple ideas of technologies he wanted in the Studio: clickers, emotive headsets, and many others. Having used the Studio for multiple classes, he had strong opinions about what made the Studio unique. His opinions on the feel and environment of the Studio influenced our constraints and criteria. Appendix K.1 shows the detailed notes from our conversation with him.

#### 4.1.1.2 *Shannon Hessel and Robert Austin*

Two team members conducted a joint interview with Shannon Hessel and Robert Austin. Shannon Hessel is a faculty member who has taught a Studio class titled Organizational Entrepreneurship with Innovation and Art. Shannon's experience in the Studio, combined with her background in theatre, allowed for a variety of useful information on classroom technologies and classroom design. She told us of her previous involvement in the Studio and mentioned ways to improve upon a few struggles she experienced. Because of the small group-work oriented design of the Studio, Professor Hessel was unable to talk to the students as a whole group and suggested a PA system as a solution to this problem. The team's detailed notes taken during Shannon Hessel's interview are in Appendix K.2, and include additional technology suggestions, technology she and her students currently use in her classrooms, and ways in which manipulating the space can enhance studio learning.



Robert Austin has never worked in the Studio at CBS but is familiar with it. His current focus is on creating a Massive Open Online Course (MOOC), after which he plans on teaching courses in the Studio. The team asked about his work so far with MOOCs, as well as his thoughts on combining MOOCs with studio learning. Despite not having any previous teaching experience in the Studio, Austin had multiple recommendations of technologies that could be implemented into a studio space. He explained technology that he currently uses in classes, such as inviting guest speakers for his class through Skype. He is interested in using videos to connect to other universities such as Rhode Island School of Design or Copenhagen Institute for Interactive Design. Austin believes this technology can be useful in studio learning. Appendix K.3 displays detailed notes taken from Austin's interview, including technological selections and the idea of MOOC's and the Studio.

Rob Austin and Shannon Hessel have both taught many classes outside of the Studio using Harvard's Case Study Method (CSM). They wondered if it would be possible to bring the CSM into the Studio. Hessel plans to test the CSM in a studio environment in the summer of 2014, whereas Austin has not yet figured out how he would like to bring it into the Studio. The team decided that integrating the case studies with studio learning is outside of the scope of the project, as research suggests that a successful case study environment depends mostly on the layout and design of the space (Rebeiz, 2011).

#### *4.1.1.3 Daved Barry and Frederick Fog*

All four team members conducted an interview with Daved Barry and Frederik Fog. Daved Barry is a professor at CBS, and co-founder of the Studio. Barry has a long history with studio pedagogy and is a pioneer in business studio education. With this experience, he had several suggestions of ICT solutions and opportunities for technological enhancement. One of

his ideas is to implement a behavioral simulation into the Studio, in which there are groups where each student is assigned a position as a CEO. Each CEO gets an envelope telling them a situation that they are going to face. This situation runs for 1 – 2 days, and students face different emotions and a variety of decisions. A camera would record the entire process, and the students spend the rest of the week looking at the film clips while analyzing their decision-making process. Barry thinks that technology that can easily record class activities for later review would fit into the studio pedagogy, since he emphasizes that reflection on one's process is important.

Frederik Fog is a graduate student who is potentially working with Daved Barry on his Master's thesis paper. Fog has not taken any classes in the Studio, but he had many helpful suggestions on technology being implemented in a classroom setting because of his current work as a consultant. Fog thinks that technology can hide student insecurities behind anonymity to increase engagement. While he has used clickers as a potential solution, he admits that they do not fully engage students. He recommends that, instead, students should be able to use their own devices (such as cell phones and computers) to answer professors' questions. Another suggested solution is to provide student groups with their own iPads, because in addition to the device being an interactive art tool, it allows students to contact their professors anonymously to ask questions. Appendix K.4 displays detailed interview notes from Daved Barry and Frederik Fog.

#### *4.1.1.4 Karl-Heinz Pogner and Lena Mygdam Zwisler*

Two team members conducted a joint interview with Karl-Heinz Pogner and Lena Mygdam Zwisler. Pogner has arranged and conducted workshops in the Studio with the Study Board and other stakeholders, so he is familiar with the idea of studio learning and activities which take place therein. Currently, Pogner is working on a course that involves groups of two

Danish students and two students from another country working in collaboration. One idea for a potential technology to implement was a communication software that allows this partnership. He also stressed that the software and hardware should be easy for the students at both CBS and foreign universities, because the systems need work together seamlessly. He also notes the lack of technical support at CBS, which highlights the importance technology's reliability. Appendix K.5 exhibits a more detailed description of the notes taken from the interview conducted with Pagner.

Lena Mygdam Zwisler is a teacher at CBS who focuses on communication within the business world. She does not currently use the Studio but expressed interest to Pagner about potentially using the Studio space. Lena supported Heinz's opinions on the necessity of communication software and the reliability of technology. Both Pagner and Zwisler are teaching in the floor above the location of the new studio space. If possible, they would like to take advantage of the proximity of the new Studio by utilizing the space in their lessons. Appendix K.6 displays the notes from Zwisler's interview.

#### *4.1.1.5 Anonymous Interview*

One team member interviewed a member of the CBS faculty who wishes to remain anonymous. This professor has previously used the Studio, but found that his classes were not enhanced by the Studio classroom. This provided an opportunity to get a unique perspective on how to improve the Studio with technology. The professor's main desires were a 3D printer and "tools to create and visualize," which are common with other professors' input. The teacher also had some suggestions that were not specifically ICTs, such as "Tool Shed Tools" like drills and saws. Appendix K.7 includes detailed notes from this interview.

#### 4.1.1.6 *David Dunne*

One team member interviewed David Dunne by telephone. Dunne is a business professor at Toronto University. He founded RADIUS on behalf of the Beedie School of Business at Simon Fraser University, which is an initiative that applies the studio pedagogy in design thinking. Although RADIUS used the studio pedagogy, he did not consider it an official studio space; classrooms were only temporarily modified in order to accommodate the course. Dunne provided the team with another professional view on technology in studio learning.

Dunne focused on two areas of technology that a studio environment would benefit from: 3D visualization and communication outside of the studio. Dunne highlighted 3D printers as an extremely beneficial addition to a studio environment, noting that would provide students with possibilities that they had not previously had. Communication was another important opportunity for improvement, as students can't always meet at the same time outside of class hours. Being able to communicate and share ideas while outside of the studio space would greatly benefit the studio, enabling projects to be worked on in different environments.

Appendix K.8 contains notes from the phone interview.

#### 4.1.2 Classroom Observation

Three professors granted the team access to observe the activities conducted in their courses at the Studio. These three facilitators were Balder Onarheim, Daved Barry, and Lars Heide. Note that facilitators typically hold activities in the Studio during the fall semester, since that is the elective semester at Copenhagen Business School. The team conducted data collection during the spring semester, where very few facilitators teach courses in the Studio. Therefore, this method did not assess the entire array of courses taught in the Studio. Furthermore, even though studio activities were held infrequently, students often visited the

Studio for their own group work - to hold discussions, use the whiteboards, or as a quiet space to work. The team decided not to fill out classroom observation sheets for these students using the Studio independently, since the information would be redundant or covered by observing other classroom activities.

Balder Onarheim conducted a course called Applied Neurocreativity in the Studio, and Table 7 below displays this class's classroom observation sheet. The class emphasized group work, research, and data collection. Most students were sitting in groups, engaged in discussion, and used whiteboards as focal points. Sometimes, the facilitator would ask the students to go collect anthropological data and present their findings. These two observations yielded two possible opportunities: shared screen technology to aid in their group activities by further connecting their laptops, and technology to assist in data collection.

*Table 7 - Applied Neurocreativity Classroom Observation Chart*

<b>Facilitator:</b>  Balder Onarheim	<b>Describe Activity:</b>  Small groups of about 3 – 4, the teams make surveys on a computer, they have lectures then do group work in the studio since it is a different environment from classrooms, the students conduct field research	<b>Student Equipment:</b>  Laptop, craft equipment, post-it notes	<b>Other Notes:</b>  Is there a way to improve research? The groups cover a lot of space when they break off into groups, not a lot of recognizable areas with room for improvement	<b>Possible Technological Opportunities:</b>  Shared screens for group work, data collection technology, sound dampening
<b>Subject:</b>  Applied Neurocreativity		<b>Faculty Equipment:</b>  N/a		<b>Possible Constraints:</b>  N/a

Daved Barry facilitates a regular course called Fine Arts of Leadership, and Table 8 shows the classroom observation sheet for that class. The professor begins this course by teaching short leadership lessons and then assigns a small art project to represent a problem pertaining to leadership. Next, the students complete a large, eight week project wherein they choose a leadership problem and present it in an art-style exhibition. This class had a heavy emphasis on art and craft; students used creative tools to visualize or represent their problems through non-traditional means.

*Table 8 - Fine Arts of Leadership Classroom Observation Chart*

<p><b>Facilitator:</b> Daved Barry</p>	<p><b>Describe Activity:</b> Experimenting with art, less about leadership, start out teaching leadership then start with small project representing the problem and a solution with art, the “Vernissage” is the culmination of an 8-week project</p>	<p><b>Student Equipment:</b> Musical Instruments, VGA connection to TV, whiteboard/markers (with pictures connected with strings), laptops, iPod speaker system, crafting items, spotlighting</p>	<p><b>Other Notes:</b> Students thought tech might be intrusive, emphasis on open-ended projects, presentation of the projects was important</p>	<p><b>Possible Technological Opportunities:</b> Technological art tools, sound/recording studio technology, digital visualization, physical visualization, recording technology, presentation technology</p>
<p><b>Subject:</b> Fine Arts of Leadership</p>		<p><b>Faculty Equipment:</b> Camera for recording</p>		<p><b>Possible Constraints:</b> Taking away from hands-on style, intrusive technology</p>

The Fine Arts of Leadership course concept lead to some interesting technological opportunities, such as studio sound equipment. One student represented groups of employees working in harmony by conducting students in an instrumental performance. The project team noted that sound studio equipment could be useful for similar creative projects involving music. The team also noticed that the facilitator would use a handheld camera to record the presentations during this exhibition. That process could possibly be improved if recording technology was introduced to the Studio, where professors and students could record presentations for future uses.

The third and final classroom observation took place in the Organizational Innovation and Entrepreneurship course, led by Professor Lars Heide. Table 9 displays the classroom observation chart that two team members filled out for this course. The team members noticed the course consisted of students working in groups, and the professor would lead that discussion with groups in one room while the other groups spread out around the Studio and worked together.

Table 9 - Organizational Innovation and Entrepreneurship Classroom Observation Chart

<b>Facilitator:</b>  Lars Heide	<b>Describe Activity:</b>  Group work, groups of 6 – 8 work together, professor meets w/ groups for discussion, the groups who aren't meeting with professor are working separately in the meantime	<b>Student Equipment:</b>  Laptops (about 50/50 Mac vs PC), Whiteboards, moveable whiteboards (as a divider), camera phones (to capture whiteboard)	<b>Other Notes:</b>  Whiteboards used extremely often, there is a disconnect between physical media and digital media, the Studio space is crowded, the separation of groups looks uncomfortable, heavy use of flowcharts	<b>Possible Technological Opportunities:</b>  Professor and student interaction, sound dampening, capturing whiteboard work
<b>Subject:</b>  Organizational Innovation and Entrepreneurship		<b>Faculty Equipment:</b>  Whiteboard		<b>Possible Constraints:</b>  N/a

The rooms in the Studio were cramped with students and the groups were dispersed uncomfortably. Additionally, the acoustics in the Studio were not ideal, and the students had a hard time communicating with the professor or other students. Communication technologies could possibly improve this aspect of the class. Another possible technological opportunity derived from observing this class is capturing whiteboard work; this is notable because the techniques students used in this class included a lot of whiteboard work. Subsequently, students would take pictures of the whiteboard to capture that information. The team believed that there might be better technological options to capture whiteboard work.

#### 4.1.3 Student Conversations

As mentioned in Section 4.1.2 the project team was able to sit in on three classes that took place in the Studio. Balder Onarheim's and Lars Heide's classes involved students working



on group projects which made student conversation impossible, because it would interrupt or distract students from their classwork. Fortunately, Daved Barry's class consisted of student's presenting their semester long final projects. This allowed the group to interact with students, learn about their projects, and ask them about their views and opinions of the Studio. By talking to the students in an informal environment, the team captured students' current opinions on the Studio, opportunities for technological improvement, and any specific suggestions of ICT solutions that they wanted implemented in the Studio.

Two team members talked to an international student from Canada. He mentioned that the Studio was a deciding factor in his decision to come to CBS for graduate studies. This student liked the studio environment but mentioned that there was no sound system currently installed in the Studio space. He was limited to using an iHome for audio projection in his project that focused on sound. A sound system can help enhance studio learning, and it could be used in a variety of activities for multiple classes.

Another class conversation started when two group members spoke to four students about their project for Daved Barry's class. All four students were from different countries with one being from Denmark. One of the students suggested that a 3D Printer would be useful, but he did not specify a problem that it addressed.

Despite the lack of classes and the lack of opportunities to speak to students during class time, the few conversations that took place enabled the team to get a different perspective on students' views on the Studio and possible technological opportunities.

#### 4.1.4 Visiting the New Studio Space

The team visited the new Studio space on March 27th on a tour guided by our sponsor Stefan. The original objective of the visit was to measure the new space and take notes on any

unique features such as equipment already in place, layout of the space, and any discernable technology infrastructure. This objective was set in place assuming that the new space was under construction, or already completed. This did not prove to be the case. The space that the new Studio will occupy was virtually untouched from its previous state as a computer lab - the faculty had not begun construction, and most of the old equipment was still in place.

Instead, a team member took notes on the expected layout, as described by Stefan during the tour. The team placed a greater emphasis on talking with the architect, Siv Britt Mansa, to make up for the lack of measurements and constraints. Stefan had originally planned this meeting, and invited the team to sit in on it and ask questions. Siv provided blueprints of the planned layout. Figure 5 shows the current iteration of the layout for the new Studio (note that the designs and zones are subject to change). The new Studio will be divided into three sections, with various adjoining rooms off to the side.

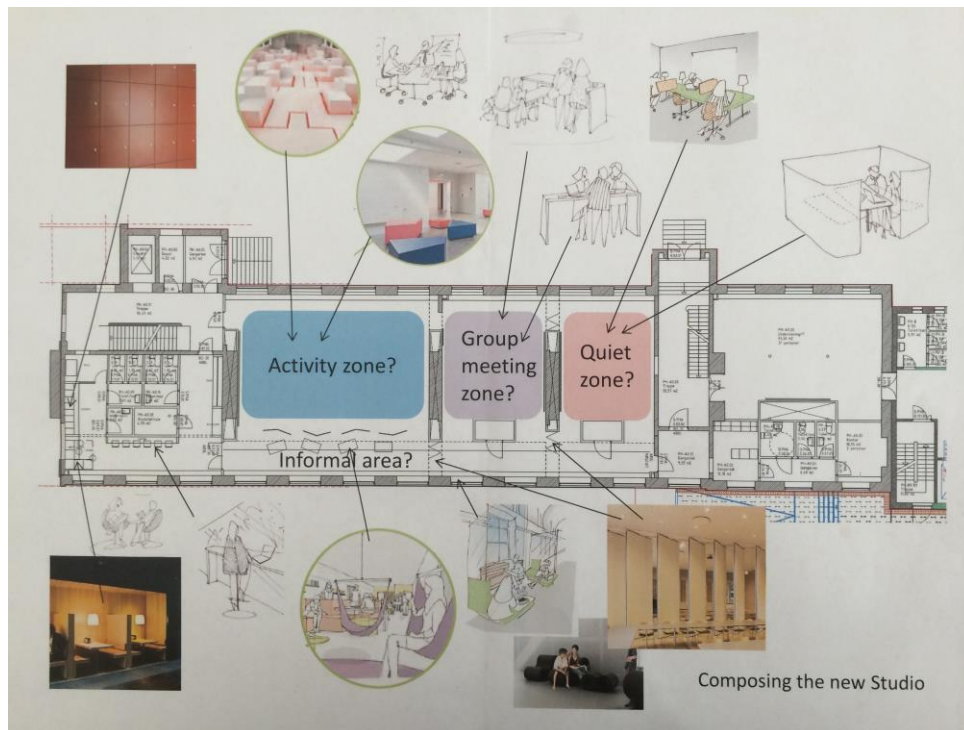


Figure 5 - Proposed Layout of Studio Space

Siv answered the two main questions the team had about electrical and overall constraints: there would be no constraints that were based on electrical abilities of the Studio. The architect was aware of the necessity for plenty of outlets, and has already planned for a sufficient number of them lining the walls. She also explained that one constraint present in the new space was the presence of projectors. Stefan and Siv, with advice from the team, decided to plan on leaving the projectors already built into the Studio. Siv also brought up the multiple rooms as a constraint. This highlighted the importance of a sound system to allow for multi-room communication.

## 4.2 Distilled Data

The team reviewed all of the interview notes, classroom observations, and student conversations to distill the collected data into three categories of data: ICT solutions, technological opportunities, and constraints. The interview notes contained within Appendices K - R are highlighted to reflect the results of the open coding method, and each interview begins with a key describing the relationship between the highlight colors and the category of data.

The distillation produced few specific technologies from notes; instead it produced many types of ICT solutions, such as 3D printing and photo editing software. The group compiled a list of both specific technologies and these technology types. After discussion, some suggested ICTs were not applicable to the goals of this project, so the team removed these from the distilled ICT solution list. Appendix L lists the removed ICT Solutions with a brief description of why they were removed. Table 10 below contains the 19 distilled ICT solutions in alphabetical order.

Table 10 - Distilled ICT Solutions

<b>Distilled ICT Solutions</b>	<b>Source(s)</b>
3D Printers	Interview with Robert Austin, Interview with Anonymous, Student Conversation
Cameras	Daved Barry Class Observation
CAVE System	Interview with Robert Austin
Classroom Capture	Interview with Daved Barry
Clickers	Interview with Balder Onarheim
Dropbox	Interview with David Dunne
Emotiv Headsets	Interview with Balder Onarheim
Google Drive	Interview with David Dunne
PA Systems	Interview with Shannon Hessel
Phone Applications to Interact with Professor	Interview with Daved Barry, Interview with Frederik Fog
Portable Microphones	Daved Barry Class Observation
Projectors	Interview with Balder Onarheim
Shared Screens	Interview with Robert Austin
Sky Servers (Cloud)	Interview with Daved Barry
Soundboards	Interview with Daved Barry
Survey Technology	Interview with Balder
Tablets	Interview with Daved Barry, Interview with Frederik Fog, Interview with Robert Austin
Webcams	Interview with Robert Austin
Whiteboard Capture Technology	Lard Heide Class Observation, Interview with David Dunne

The next step in this investigation was to look for potential opportunities for improvement through technology implementations. Table 11 below displays the list of the distilled technological opportunities. Some of the technological opportunities that the raw data provided are not included in the 12 opportunities in the table below.

Table 11 - Distilled Technological Opportunities

<b>Distilled Technological Opportunities</b>	<b>Source(s)</b>
3D Visualization – Digital	Interview with Anonymous, Interview with Karl-Heinz Pogner
3D Visualization – Physical	Interview with Anonymous
Accessible Sound System	Student Conversation
Communication	Lars Heide Class Observation, Interview with Daved Barry, Interview with Frederik Fog, Interview with Robert Austin,
Data Collection	Interview with Balder Onarheim, Interview with Anonymous
Data Sharing	Interview with David Dunne, Interview with Anonymous
Interactive Interfaces	Daved Barry Class Observation, Lars Heide Class Observation, Balder Onarheim Class Observation
Media Manipulation	Interview with Robert Austin, Interview with Anonymous
Presentation Display	Daved Barry Class Observation
Recording / Class Capture	Interview with Daved Barry, Interview with Karl-Heinz Pogner
Simultaneous Classroom Telepresence	Interview with Karl-Heinz Pogner, Interview with Lena Mygdam Zwisler
Sound Studio Equipment	Daved Barry Class Observation, Interview with Daved Barry

Some of the technological opportunities that the raw data yielded are not included in the 12 opportunities above. The project group removed these technological opportunities for a variety of reasons: they were outside the scope of the project, they combined with other technological opportunities, the new Studio already addresses that opportunity, or the team found the opportunity after the distillation stage. Appendix M lists these removed technological opportunities with reasons why they were not included in these results.

The following stage of this process involved distilling the constraints from professors and students. Constraints intended to facilitate the elimination of technology solutions that did not meet their standards, reducing the list of solutions. Table 12 below contains the list of the distilled constraints.

Table 12 - Distilled Constraints

<b>Distilled Constraints</b>	<b>Source(s)</b>
Does not take away from the Studio Aesthetic	Interview with Balder Onarheim, Interview with Daved Barry, Student Conversations
Enables art, but does not replace it	Daved Barry Class Observation, Interview with Balder, Interview with Anonymous
Is applicable to entire Studio space	Lars Heide Class Observation
Does not have a better non-ICT option	Interview with Shannon Hessel

The final stage of the distillation process involved identifying criteria to help score the technological solutions. Utilizing the knowledge of the Studio and the methods described in Section 3.1, the team brainstormed the following list of criteria, presented in alphabetical order:

- Aesthetics
- Ease of Implementation
- Ease of Use
- Flexibility
- Price
- Reliability
- User Reviews

### 4.3 Research Results

The four team members split up the 12 technological opportunities, then conducted research on the distilled technological suggestions. The team members also conducted research on other potential ICT solutions to their assigned opportunities. Information on criteria and general descriptions comprised the research notes. This phase was expected to be fairly straightforward, but the team ended up running into problems, as described in Section 5.1.

The team researched 114 technologies that addressed the 12 final technological opportunities. During this research, many technologies tended to be similar to each other (mainly projectors and webcams). Even if few ICT solutions addressed a technological opportunity, it does not imply the research failed. Technologies may not have been available to address every technological opportunity at the time of the research phase. Appendix N contains the entirety of the research results, but this section summarizes the results by presenting tables with the ICT solutions for each technological opportunity, as well as a brief explanation of each.

Table 13 below displays the research results for the Digital 3D Visualization technological opportunity. Unfortunately, technological solutions that improve this opportunity were difficult to find; the team member could only find two programs that properly addressed 3D visualization in digital media.

*Table 13 - 3D Visualization - Digital Research Results*

<b>3D Visualization – Digital</b>	
ICTs that allow students to visualize ideas in a digital media, similar to the way they physically make objects or designs using crafts.	
SketchUp	Simple 3D modeling software
SolidWorks	Computer aided drafting software

Table 14 contains the results for the Physical 3D Visualization opportunity. These results are a list of 3D printing devices that can be used to rapidly prototype physical models for the students. 3D printers are the only type of technology that the team could find to satisfy this technological opportunity, but many options for 3D printers currently exist. The research found that newer models of 3D printers aimed to be affordable, flexible, and intuitive in order to appeal to a growing consumer base that is interested in owning this technology.

Table 14 - 3D Visualization - Physical Research Results

<b>3D Visualization – Physical</b>	
ICTs that supplement the crafts and physical visualization that already take place in the Studio	
Cubify Cube 3	3D printer with WiFi
Peachy Printer	3D printer characterized by its low price
Pirate3D Buccaneer	3D printer with WiFi
Printrobot Assembled Jr	3D printer
Ultimaker Original	Open source 3D printer
XYZ Printing daVinci 1.0	3D printer

Table 15 contains the results for the Accessible Sound System opportunity. This research yielded 15 solutions, but the types of technology varied; they spanned from portable microphones to speakers. Apogee MiC and Blue Microphones Snowflake were two microphones that the team researched. Other technologies in this opportunity, such as Bose Soundlink and the Kinivo ZX100 are audio playback devices, meant to be used as speakers. The Nutone Intercom System and FlexCat devices are sound systems designed to span a large space. Accessible Sound System has plenty of room for improvement, with many different potential options within it.



Table 15 - Accessible Sound System Research Results

<b>Accessible Sound System</b>	
ICTs addressing this opportunity should enable students and professors to reach others with their voice or audio-playback devices.	
Apogee MiC	Microphone with a USB plug-in
Blue Microphones Snowflake	Microphone with a USB plug-in
Bose Soundlink	Bluetooth speaker
FlexCat	PA system with four to six portable speakers that provides two way communication between instructors and students
FrontRow Pro Digital	PA system with two wall speakers
FrontRow to Go	Portable PA system
HISONIC HS120B	Portable PA system with multiple types of microphones
iHome iHM60GY	Small speaker with an auxiliary cable input
Kinivo ZX100	Small speaker with an auxiliary cable input
Nutone Intercom System	Intercom system that spans multiple rooms
PD-IT Pro Digital IR System	PA system with wall speakers
RedCat Access	Portable PA system
SMART Audio	PA system with four overhead speakers
TOGO 925RD	Portable PA system
TopCat	PA system with overhead speakers

As is made clear by Table 16, finding ICT solutions to address the need for classroom communication was difficult. However, NearPod solves many of the issues involved in improving classroom communication. It is a mobile, tablet, and computer application that supports the sharing of content between professors and students. Beyond sharing screen content, professors can also poll or quiz students: either to get opinions or to track understanding of material.

Table 16 - Communication Research Results

<b>Communication</b>	
In a studio environment, communication between instructors and students is important. Since a variety of activities may be happening at the same time in the Studio, communication may be difficult. ICT may be available to support this communication.	
NearPod	Program that enables communication of words, content, or polls

Table 17 below contains the research results for the Data Collection technological opportunity. Research on technologies to improve data collection yielded two main technology types: polling software and clickers. The clickers, Turning Technologies and i>clicker, are similarly priced solutions that allow professors to easily gather student opinions and answers through the use of a mobile application or separate physical device. The team found a range of polling software ranging from basic solutions like Google Forms, to more professional paid services such as Qualtrics. SurveyGizmo and SurveyMonkey fall in between these two - they are both free for many basic features, but cost money after a certain number of surveys have been sent.

Table 17 - Data Collection Research Results

<b>Data Collection</b>	
This type of technology should allow students to gather data for projects or allow professors to poll their students	
Google Documents / Forms	Online survey making and distributing tool
i>clicker	Classroom clicker
SurveyGizmo	Online survey making and distributing tool
SurveyMonkey	Online survey making and distributing tool
Turning Technologies	Classroom clicker
Qualtrics	Paid survey making and distributing tool

Table 18 shows the two data sharing services the team found. Dropbox and Google Documents both cover the need very well, so the team researched these programs to compare them. Both are file-sharing and saving services that store files on the cloud for easy access on any machine. Google Documents provides the advantage of live collaboration, while Dropbox is slightly easier and more seamless to use because of its desktop application.

*Table 18 - Data Sharing Research Results*

<b>Data Sharing</b>	
With students often working collaboratively in the Studio, there is a need for technology that allows students and professors to easily share data.	
DropBox	File sharing service that integrates with the user's operating system
Google Documents	Online file sharing service that enables live collaboration

Table 19 contains the ICT solutions that satisfied the Interactive Interfaces technological opportunity. The results of this research found that there are many different types of solutions that innovate how users interact with their work; for example, the Emotiv Headset reads the user's brain waves and converts them to commands for a computer, whereas the eBeam edge can track the user's whiteboard activity and simultaneously draw words or figures on a computer. Since much of the work that is conducted in the Studio at CBS is based on creativity and art, these solutions can provide more options to express the students' creativity or easily capture art and store it as data.

Table 19 - Interactive Interfaces Research Results

<b>Interactive Interfaces</b>	
The Studio has a very interactive learning environment. ICT may be able to enhance the interactivity by expanding students' options to manipulate or edit data.	
CAVE System	High-tech virtual reality system
eBeam Edge	Whiteboard capture hardware and interactive screen
eBeam Engage	Whiteboard capture hardware and interactive screen
Emotiv Headsets	Headset that allows user to interact with computers using thoughts
iPad with Retina Display	Tablet computer with access to many applications
Samsung Galaxy Note 10.1	Tablet computer with access to many applications
SmartBoard 480iv	Interactive screen
Wacom DTU-1031	Tablet that (with a projector) becomes an interactive screen
Wacom DTU-1631	Tablet that (with a projector) becomes an interactive screen

Table 20 lists the research results for the Media Manipulation technological opportunity. Gimp and Photoshop are commonly used photo editing software that address the more traditional artistic, photo editing needs of the Studio. Photoshop is the industry standard for the majority of photo editing tasks. Gimp is an open-source photo editor with many of the same features as Photoshop, but it is free to download and use. Audacity is a commonly-used sound editing software that users can download for free.

Table 20 - Media Manipulation Research Results

<b>Media Manipulation</b>	
Students in the Studio often use imagery or audio to artistically express management issues. ICTs can help students express creativity in ways that drawing tools or instruments cannot.	
Adobe Photoshop Elements	Industry standard photo editing software
Audacity	Free, open-source photo editing software
Gimp	Free, open-source sound editing software

Table 21 shows the solutions gathered for the presentation displays technological opportunity. There were a total of 40 researched technologies, with most of the solutions being projectors, interactive projectors, or 3D projectors. Professors often use presentation displays in all types of classroom pedagogies, so it was important to address all functionalities. At the same time, many solutions were very similar in characteristics and use.

*Table 21 - Presentation Displays Research Results*

<b>Presentation Displays</b>	
Presenting projects or findings is common in the Studio, and ICTs can help display pictures, videos, charts, or slideshows to a large audience.	
Acer X1240	Projection Display
BenQ MMS517	Projection Display
BenQ MS502	Projection Display
BenQ MS504	Projection Display
BenQ MS616ST	Projection Display
BenQ MX520	Projection Display
BenQ MW519	Projection Display
BenQ MW523	Projection Display
BenQ MX620ST	Projection Display
BrightLink 426Wi	Interactive Projection Display
BrightLink 485Wi	Interactive Projection Display
BrightLink 585Wi	Interactive Projection Display
BrightLink 595Wi	Interactive Projection Display
Dell 1210s	Projection Display
Dell 1610HD	Projection Display
Dell S500Wi	Projection Display
Epson EX 6220	Projection Display
Epson EX 7220	Projection Display
Hitachi CP-DX250	Projection Display
InFocus IN112	Projection Display
InFocus IN3138H	Projection Display
NEC NP-M300XS	Short-Throw Projection Display
NEC NP-M311W	Short-Throw Projection Display
NEC NP-M311X	Short-Throw Projection Display
NEC NP-VE281	Short-Throw Projection Display
NEX NP-M352WS	Short-Throw Projection Display
Optoma DS325	Projection Display

Optoma TTW675 UTiM-3D	Projection Display
Optoma W304M	Projection Display
Optoma W306ST	Projection Display
PowerLite 1940W	Projection Display
PowerLite 1945W	Projection Display
PowerLite 1955	Projection Display
PowerLite 1960	Projection Display
SMART LightRaise 40Wi	Projection Display
Sony VPL-DX120	Projection Display
Sony VPL-DX140	Projection Display
Sony VPL-SW535C	Projection Display
ViewSonic PJD5132	Projection Display
ViewSonic PJD5134	Projection Display

Table 22 shows the ICT solutions for the recording/class capture technological opportunity. The six possible solutions involve software which can be installed so that students are able to re-watch a lecture after it has already happened. The Studio focuses on a hands-on approach to learning, so instead of being used to record lectures, class capture may be used to record student processes or presentations. This allows students to reflect and learn upon their work while also allowing other students to reference them.

*Table 22 - Recording / Class Capture Research Results*

<b>Recording / Class Capture</b>	
An important part of studio education is reflection on the design and making process. ICTs that support classroom recording would be a welcome addition for this aspect.	
Desire2Learn Capture Software	Software class capturing system
Echo360	Software class capturing system compatible with microphones and display systems.
Juno Tower Receiver	Software class capturing system and PA system
Tech Smith	Software class capturing system
Tegrity	Software class capturing system
GoPro Hero 3	High-quality, durable camera

Table 23 below contains the Simultaneous Classroom Telepresence technologies.

Professors displayed an interest in being able to teach multiple studio classes at once, whether

the classes were in different rooms, or even different studios around the world. This is another opportunity with multiple types of solutions, as there are several important factors to consider in order for a simultaneous class to occur. Software options are available for multiple classes to share a single instructor, such as GoToMeeting, and LogMeIn. Hardware options exist as well, such as the Microsoft LifeCam and the Samsung VG STC3000. If a professor wishes to be able to conduct simultaneous classroom telepresence, there are plenty of options to assist them.

*Table 23 - Simultaneous Classroom Telepresence Research Results*

<b>Simultaneous Classroom Telepresence</b>	
There is room for the Studio to improve by allowing students to communicate and work with anyone in the world. ICTs that connect to other classrooms or experts can expand the activities conducted in the Studio.	
Creative Live! Cam Connect HD	Webcam
Creative Live! Cam Socialize	Webcam
Creative Live! Cam Video IM Ultra	Webcam
FaceVision Touch Cam V1	Webcam
GoToMeeting	Software allowing users to share a screen across several computers
Iris LiveView	360 degree camera for recording classrooms
Logitech C270	Webcam
Logitech C310	Webcam
Logitech C615	Webcam
Logitech C920	Webcam
LogMeIn	Remote screen accessing software used by IT services
Mikogo	Screen sharing over web
Microsoft HD-3000	Webcam
Microsoft LifeCam	Webcam
Nikon Standard Camera	Webcam
Samsung VG STC2000	Webcam
Samsung VG STC3000	Webcam
ScreenLeap	Software allowing users to share a screen across several computers
Trust Exis	Webcam
Trust Exis w/ Chatpack	Webcam
Trust Primo	Webcam

Table 24 contains three ICT solutions for the Sound Studio Equipment technological opportunity. The most applicable sound equipment that the researcher found were launchpads, which activate tracks when the user presses a button. These pads are available in a variety of forms; some contain just rows and columns of buttons, while others include a keyboard so the user can play notes on top of the tracks that he or she activates. While these more complex forms add flexibility to the device, they can also make the device more difficult to use.

*Table 24 - Studio Sound Equipment Research Results*

<b>Studio Sound Equipment</b>	
Since students are encouraged to express their creativity in the Studio, providing equipment from sound studios can enable students to express this creativity in another media.	
Launchkey	Full keyboard with a MIDI soundboard to activate audio loops
Launchkey Mini	Mini keyboard with a MIDI soundboard to activate audio loops
Launchpad Mini	MIDI soundboard that can activate audio tracks

Many of these technological solutions that were similar to others in functions and characteristics. As a result, the team removed redundancies from projectors and webcams, leaving a total of 77 solutions to analyze.

#### 4.4 Analysis of ICT Solutions

The research provided a plethora of possible ICT solutions to enhance the CBS Studio's activities; however, the team's goal was to provide a proposal of ICT recommendations consisting of a prioritized list of the top five solutions, along with a top solution in each technological opportunity for the Studio. In order to find the best ICT to recommend, the team used selection methods to help narrow down the solutions. This process, outlined in Section 3.4, involved finding weights of the criteria for judging the possible solutions, assigning scores to the possible solutions for each opportunity, and finding weights for each technological opportunity.



As discussed in section 3.4.3, the team did not use constraints in the analysis. This section describes the outcomes of each of these methods.

#### 4.4.1 Criteria Weights

The team asked Stefan Meisiek, Daved Barry, Steven Taylor, Balder Onarheim, and Shannon Hessel to fill out a pairwise comparison chart. Appendix O displays the pairwise comparison charts filled out by the five faculty members. The resulting scores translated into weights using the process explained in Section 3.4.1. Table 25 below displays the results of Stefan and the other four Professor's weighting combined, from highest to lowest weight.

*Table 25 - Criteria Weight Results*

<b>Criteria</b>	<b>Weight</b>
Flexibility	4.21
Reliability	3.74
Aesthetics	3.39
Ease of Use	3.39
Ease of Implementation	1.87
Price	1.75
User Reviews	1.64

The results of Table 25 represent the aspects of ICT solutions that these professors value in the technological solutions. Note that the highest weighted criterion is flexibility; the proposed ICT should allow for multiple activities to be conducted. This result could be biased, because the professors might care more about the use of the technology than the price or the ease of implementation. Regardless, this data is still valid for the goals of this project, since Stefan had the largest impact on the numbers in this table, and ultimately he will decide the ICT implementations.

Stefan also filled out a pairwise comparison chart for the technological opportunities in a similar method to the criteria chart. Table 26 below displays the resulting totals of the pairwise comparison chart from highest to lowest scoring opportunities.

*Table 26 – Stefan’s Technological Opportunities Pairwise Comparison Chart Results*

<b>Technological Opportunities</b>	<b>Chart Total</b>
3D Visualization – Physical	11
Data Sharing	10
Data Collection	9
Media Manipulation	8
3D Visualization – Digital	6
Interactive Interfaces	6
Presentation Display	5
Communication	3
Recording / Class Capture	3
Sound Studio Equipment	3
Accessible Sound System	2
Simultaneous Classroom Telepresence	0

The highest weighted technological opportunity is physical 3D visualization; because of the Studio’s heavy influence from art, a means to physically create and manipulate materials would be extremely beneficial. Many professors have stressed how useful a 3D printer could be, and this aligns with the high rating that Stefan assigned to physical 3D visualization. The lowest weighted opportunity, simultaneous classroom telepresence, was ranked at a 0. As described in Section 3.4.2, the team added a point to every score.

#### 4.4.2 ICT Solution Criteria Scores

A team member transcribed the list of ICT solutions onto several Excel spreadsheets for individual scoring. Each team member graded the technologies they had researched, as

described in Section 3.4.2, on a scale of 0 – 5 for all of the listed criteria. Another group member checked the scores using the research notes for inter-coder reliability. Six technologies had their scores changed, most often for the judgment based criteria: ease of use, ease of implementation, and aesthetics. The Excel sheet multiplied these scored by the criteria weights, and then summed them to receive the criteria score for that ICT. The Excel spreadsheets combined into a final listing of the ICTs and their criteria scores, which Appendix P displays.

#### 4.4.3 ICT Solution Overall Scores


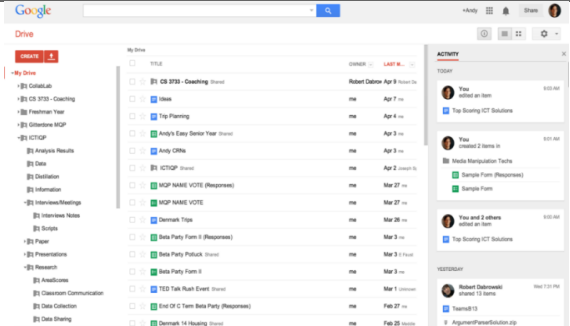
Part of the goal of the proposal is to introduce technologies that can be used for a broad variety of purposes. An ICT solution that addresses several technological opportunities may prove to be more valuable to the Studio than an ICT solution that addresses a single technological opportunity very well. The team assigned weights to the opportunities in Section 4.4.1. Since the weights of the technological opportunities were percentage based, the overall scores of the technologies are drastically lower than the criteria scores. Most solutions only addressed one or two opportunities, but this method highlighted some solutions that did not perform well in their technological opportunity but addressed several others (most notably, the iPad Retina). Appendix P contains all the overall scores for the ICT solutions in descending order.




#### 4.4.4 Top Performing ICT Solutions

The team considered the top five overall solutions and the highest performing solution in each technological opportunity (including the second-highest performing solution within 10%) for the proposal. This subsection lists these solutions gathered from the analysis phase.

The top five technologies included two redundant types of ICT solution types: two tablet computers and three 3D printers. The proposal incorporated only the highest performing technology of each type; the team removed one tablet (Samsung Galaxy Note 10.1) and two 3D printers (Cubify Cube 3 and XYZ Printing daVinci 1.0). Table 27 displays the resulting top five ICT solutions with their associated picture and descriptions.

Table 27 - Top Five ICT Solution Results

ICT Name	Picture	Description
<b>#1 iPad Retina</b>		<p>The iPad Retina is a commonly used tablet computer that can enable many different classroom activities. It can download millions of applications, many of which are free. It can be connected to TVs or projectors, meaning students can work on an iPad, then present their work to the class, and easily give a presentation.</p>
<b>#2 Google Drive</b>		<p>The user can create or upload files and folders to his or her Google account. The user is also able to share with other users by clicking “Share” and entering their emails. The documents are then editable in real time.</p>

<p><b>#3 Pirate 3D Buccaneer</b></p>		<p>This 3D printer allows the user to design a model in its multiplatform (PC and Mac, iOS and Android) app called SmartObjects, then send the model wirelessly to the printer over Wi-Fi. The stainless steel design and small size makes it fitting aesthetically for the Studio</p>
<p><b>#4 eBeam Engage</b></p>		<p>Attaches to whiteboard or other surface to allow for the interaction and recording of content.</p>
<p><b>#5 CAVE System</b></p>		<p>This system aims to immerse the user within a virtual space. It puts the user in the center of a number of walls with projected displays, and calibrates to the user's head so he or she appears to be in the middle of a virtual environment. The CAVE system tracks the user's motion, allowing him or her to interact with the space.</p>

Tables 28 through 39 list the top one or two ICT solutions for each technological opportunity, in alphabetical order by opportunity, with a picture and a description of each solution.

Table 28 - Digital 3D Visualization Results

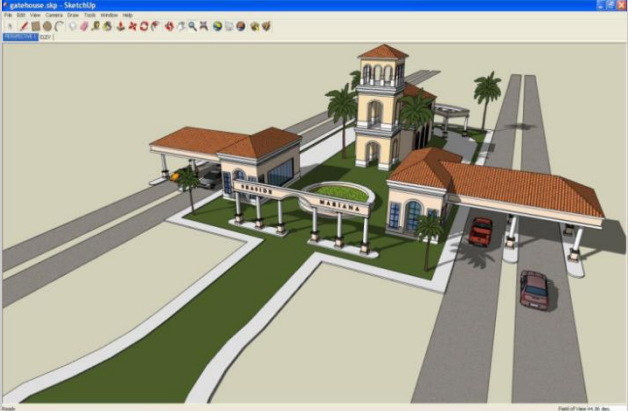

ICT Name	Picture	Description
SketchUp		3D Modeling software to design objects and spaces.

Table 29 - Physical 3D Visualization Results

ICT Name	Picture	Description
Pirate 3D Buccaneer		This 3D printer allows the user to design a model in its multiplatform (PC and Mac, iOS and Android) app called SmartObjects, then send the model wirelessly to the printer over Wi-Fi. The stainless steel design and small size makes it a fitting aesthetic for the Studio

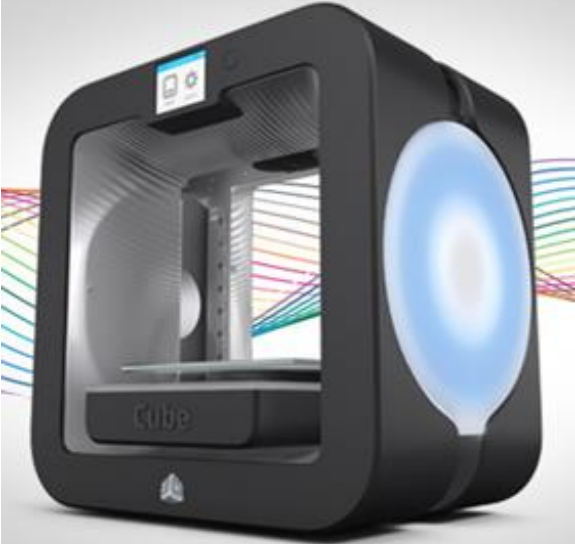
<b>Cubify Cube 3</b>		<p>A second 3D printer option with more features than the Buccaneer, but is more expensive.</p>
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Table 30 - Accessible Sound System Results



<b>ICT Name</b>	<b>Picture</b>	<b>Description</b>
<b>FlexCat</b>		<p>A 4-6 piece audio system that provides two-way communication for small group instruction.</p>
<b>eBeam Engage</b>		<p>Attaches to whiteboard or other surface to allow for the interaction and recording of content.</p>



Table 31 - Communication Results



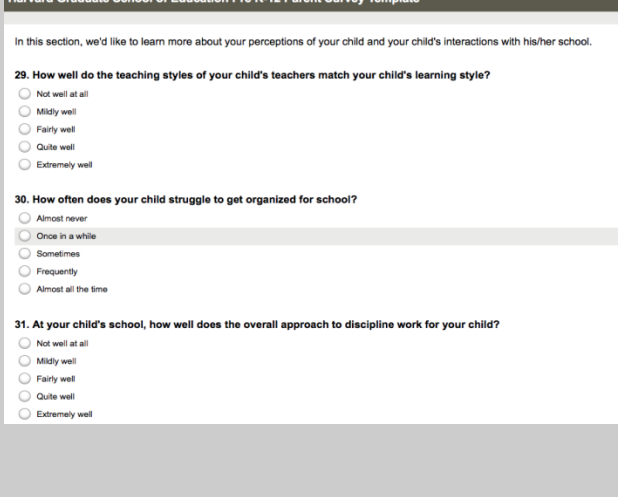
ICT Name	Picture	Description
<b>FlexCat</b>		A 4-6 piece audio system that provides two-way communication for small group instruction.
<b>NearPod</b>	<p>STUDENTS RECEIVE MULTIMEDIA CONTENT IN REAL TIME AND PARTICIPATE ACTIVELY IN CLASS.</p> 	This application facilitates the sharing of presentations, webpages, and graphics.

Table 32 - Data Collection Results

ICT Name	Picture	Description
<b>SurveyMonkey</b>		SurveyMonkey is a free, easy to use survey tool. The user is able to make surveys, each with various types of questions. Then, one can automatically send the survey to up to 100 people for free.



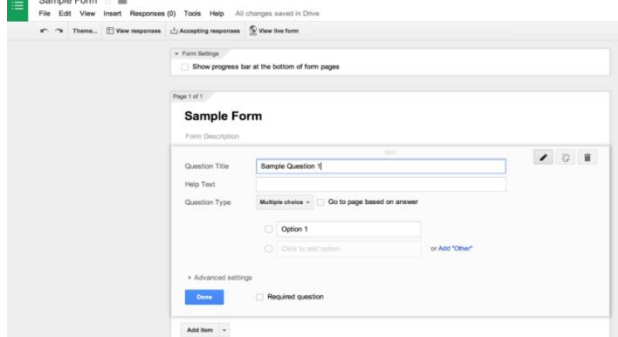
<p><b>Google Documents / Forms</b></p>		<p>Google Forms are free, easy to use survey tools. Create a survey by specifying the type and content for each question.</p>
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Table 33 - Data Sharing Results

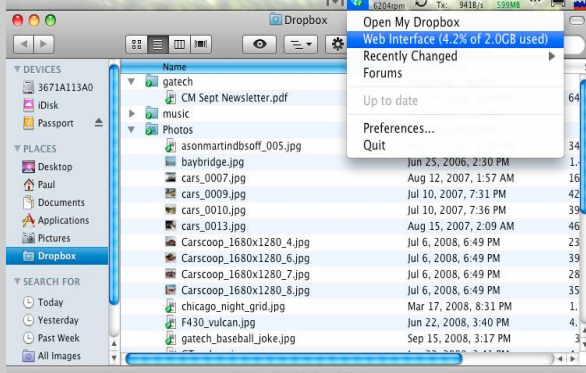
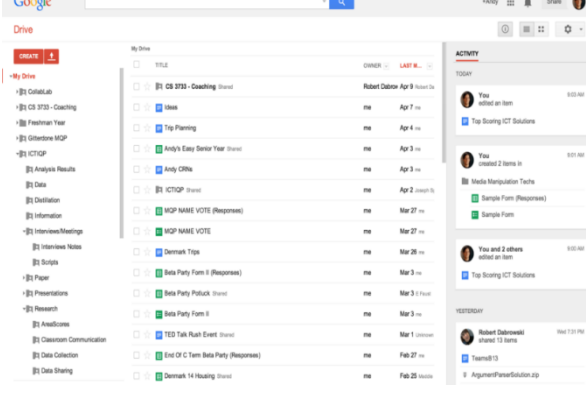
ICT Name	Picture	Description
<p><b>Dropbox</b></p>		<p>The user only needs to create an account and download the desktop application. Files are then able to be saved on a server.</p>
<p><b>Google Drive</b></p>		<p>The user can create or upload files and folders to his or her Google account. The user is also able to share with other users by clicking “Share” and entering their emails.</p>

Table 34 - Interactive Interfaces Results



ICT Name	Picture	Description
eBeam Engage		Attaches to whiteboard or other surface to allow for the interaction and recording of content.
eBeam Edge		Attaches to whiteboard or other surface to allow for the interaction and recording of content. Older, less capable version of Engage.

Table 35 - Media Manipulation Results

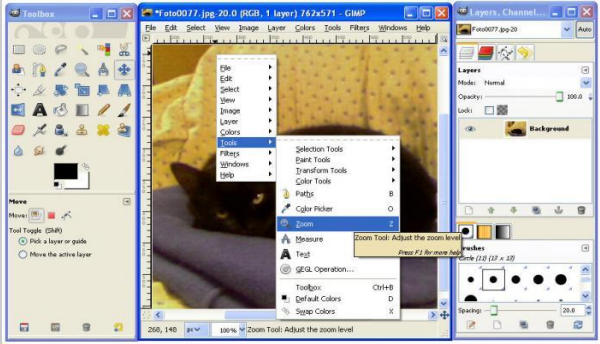
ICT Name	Picture	Description
Gimp		A free photo editing software that replicates the functionality of Photoshop. Features include tools for layering, shading, and coloring.

Table 36 – Presentation Displays Results

ICT Name	Picture	Description
<b>BenQ MW 523</b>		A classroom projector with a 1280x800 resolution.
<b>Epson EX6220</b>		A classroom projector with a 1280x800 resolution.

Table 37 - Recording / Class-Capture Results

ICT Name	Picture	Description
<b>Echo360</b>	 <p>The screenshot shows the Echo360 software interface. It features a central control panel with a play button and a 'Start Recording' button. To the right, there is a 'Video Output' window showing a person's video feed. Below that is a 'Scene-Based Navigation' panel with a list of scenes. At the bottom, there are 'Playback Controls and Timeline'.</p>	Echo360 is a lecture capture system which enables faculty to record audio, visuals, and video for students to access online in a digital format.

<p><b>GoPro Hero 3</b></p>		<p>GoPro is a mobile high-definition camera. It comes with a mount that allows it to be attached to various surfaces.</p>
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Table 38 - Simultaneous Classroom Telepresence Results





ICT Name	Picture	Description
<p><b>Samsung TV Cam VG-STC3000</b></p>		<p>Connects to any TV or display using a USB port and allows that display to run Skype.</p>
<p><b>Samsung TV Cam VG-2000</b></p>		<p>Connects to any TV or display using a USB port and allows that display to run Skype.</p>

Table 39 - Sound Studio Equipment Results

ICT Name	Picture	Description
Launchkey		Full synthesizer keyboard for audio creation and mixing.
Launchkey Mini		Mini synthesizer keyboard for audio creation and mixing.

## 4.5 Technological Literacy Results

After the team assigned scores to the ICT solutions, the next step was to assess the general technological literacy of the students and the faculty of Copenhagen Business School. Since multiple challenges presented themselves during this stage, the team conducted faculty validation surveys instead. The results from the final method are described below.

### 4.5.1 Studio Faculty Validation

Talking with faculty involved with the Studio provided an easier method to get useful feedback on the feasibility of the final ICT Solutions. Professors who took the survey were also interviewed in the early stages of our project, and were more than willing to assist the team with taking this survey.

Due to time constraints and the faculty's tight schedules near the end of Easter break, the team was only able to schedule survey sessions with two Studio professors. Fortunately, Moura Quayle, who created a business studio at the University of British Columbia, was already prepared to discuss the project via Skype. Steven Taylor, advisor of this project and business professor at WPI with Studio experience, was also available. After conducting surveys with these faculty members, the team collected four survey responses. Table 40 displays the results of this survey.

Table 40 - Professor Validation Results

	Survey Takers				Total	Is it preferred?
	Stefan	Hessel	Taylor	Quayle		
<b>ICT Solutions</b>					Total	Is it preferred?
SketchUp	1	1	1	1	4	Yes
Pirate3D Buccaneer	1	1	1	1	4	Yes
Cubify Cube 3	1	1	1	1	4	Yes
FlexCat	1	0	1	1	3	Yes
eBeam Engage	1	1	1	1	4	Yes
NearPod	0	0	0	1	1	No
SurveyMonkey	1	0	1	1	3	Yes
Google Forms	1	0	1	1	3	Yes
DropBox	1	1	1	1	4	Yes
Google Docs	1	0	1	1	3	Yes
eBeam Edge	1	1	1	1	4	Yes
Gimp	1	1	1	1	4	Yes
BenQ MW23	1	1	1	1	4	Yes
Epson EX 6220	1	1	1	1	4	Yes
Echo360	1	1	1	1	4	Yes
GoPro Hero3	1	1	1	1	4	Yes
Launchkey	0	0	1	1	2	No
Launchkey Mini	0	1	1	1	3	Yes
Samsung TV Cam (VG-STC3000)	1	1	1	1	4	Yes

The results of the survey show all but two of the ICTs passing. The two technologies that failed to meet the professor's validations were NearPod and LaunchKey. Three of the four professors rejected NearPod for several reasons. The CBS already has similar software, called

CBS Learn, which has the same function as NearPod. The faculty rarely uses the screen-sharing aspect of CBS Learn, and introducing NearPod would be redundant and likely unused. The professors also stated that the actual concept of screen sharing was not all that relevant to the studio pedagogy, and they were unwilling to spend the time to learn how to use this product.

Launchkey, the music production keyboard, was rejected for similar reasons. While two professors said that they would be interested in seeing the possibilities it would enable, they were uncertain if it could be implemented in a studio environment. The LaunchKey Mini, a simplified version of the LaunchKey, passed. This shows that although the sound production could be a useful technology, the professors did not wish to expend much energy to learn the technology. The easier the technology is, the more likely they would be willing to learn how to use it.

All other 17 technologies passed; some more than others. Most technologies received a 4, meaning all the professors said they'd be willing to learn how to use it. Professors commented that they did not know what several technologies could be applied to, and they were unaware of how the technology could be used in their current classes. Even with this confusion, the professors were willing to experiment with these ICTs if they had access to them.

## 4.6 Deliverables:

Appendix Q displays the final proposal consisted of the highest scoring technologies. The proposal begins with a Table of Contents that lists the page number for opportunities and technology suggestions, which follow a color code for each technological opportunity to make them visually distinct. The beginning of the proposal includes the top five ICT solutions: the iPad with Retina Display, Google Documents, Pirate3D Buccaneer, eBeam Engage, and the CAVE System. The 12 technological opportunities follow the top five, with the 19 proposed solutions contained therein. The team successfully created this proposal on time.



## Chapter 5: Conclusion

The Studio at the Copenhagen Business School has been successful in its first two years of educating future business leaders. This success has led to a planned expansion into a larger, better-equipped space, giving the directors of the Studio a chance to bring new technologies into the future studio space. The majority of courses in the Studio have only used minimal technology beyond cameras, speakers, and projectors.

The team established the needs of the Studio through professor interviews, classroom observations, and student conversations. Researching opportunities with room for technological improvement expanded these ideas into 114 technologies that could improve the new Studio space. We identified the best technologies by assigning scores for how well each solution met important criteria. Finally, we surveyed Studio professors to identify top-scoring technologies that might not be ideal for the Studio. The proposal lists 21 technologies that address 12 opportunities for improvement.

### 5.1 Project Challenges

Various unforeseen difficulties impacted our ability to address some complexities of this project. Differences in individual research styles, timing issues, cultures, and other factors required us to alter or forego certain steps of our work.

The largest obstacle the team faced was determining the technological literacy of students and faculty at CBS. The final proposal presents technologies that only four faculty members approved. We also considered the ease of use criterion to address this concern. While the simplified process is likely to identify easy to use technologies, it is impossible to claim that all technologies proposed through this process would be sufficiently easy to use.



Establishing an overall literacy rating proved challenging and beyond our expertise. Before arriving in Denmark the team struggled to compile a survey that fully captured what it means to be technologically literate. Indeed, we found it challenging enough to define the term “technologically literate.” Creating and conducting a methodology to establish technological literacy would likely take enough time to merit a project of its own.

Another issue is that our research lacked sufficient depth to produce a list of every existing technology that could improve the Studio. This is partially due to beginning our research with specific technology suggestions of professors. Also, many professors would reach us after our interviews with more ideas of technology or opportunities, but it was too late in the process for us to address them. In other words, we were working with a limited set of the entire range of possible suggestions.

Similarly, recommendations for Studio experts to interview came too late in our project for us to account for their opinions and suggestions. Interviews with David Dunne and Moura Quayle, who both had created business Studios at other schools, occurred after our research and analysis phases, and the team was not able to meet with the architect until after the proposal was created. David Dunne and Moura Quayle proposed several technologies that they have used in their studio spaces, and the architect supplied constraints that the team had not considered before. Had these interviews taken place earlier, their suggestions could have been included in our research.

Furthermore, we are not experts in education or in business. Having experience in either of these fields would have made it easier to find technologies and identify needs of the Studio. Having more domain knowledge could have also increased the quality of professor interviews with more in-depth conversations. With our limited experience, we occasionally struggled to

understand some of the needs stated by professors. One professor stated that he wanted “technologies that facilitate startups.” Even after follow-up questions, it remained unclear what these technologies were, and without any experience in the field, it was difficult to conduct independent research on the term.

Another potential by-product of our lack of business and education knowledge is that research on specific opportunities for technological improvement likely did not yield an entire list of solutions; research on classroom communication only produced one technology. Without knowledge of its complexities, it was difficult to find results beyond a Google search of “Classroom Communication Technologies.” Better understanding the issues around, and importance of, classroom communication would have made it easier to search for solutions that address the issue.

Flaws with the descriptions of the technological opportunities may have led to some technologies being overlooked. For instance, Media Manipulation had two clear sub-categories: Photo Editing and Audio Editing. The team never discussed splitting the opportunity into two. As a result, photo editing software was included on the proposal, while the need for audio editing software is still unaddressed.

We had to rush the final iteration of the technological literacy survey due to the multiple revisions of the process. The team had not planned for the issues that caused these revisions, such as the difference in email culture, and “the right to not be bothered”. The team would likely have decided on a different surveying method ahead of time, had these issues been known. The Studio Professor Validation that ended up taking place was conducted with only two professors in the Studio, in addition to two other Studio experts. Had we decided ahead of time on using this approach, we would have had time to talk to every Studio professor.

The differing research and scoring styles of team members may have led to issues during our research and analysis phases. Team members researched each technological opportunity and assigned scores for the criteria; meaning that some opportunities may have more in-depth research, or more generous scoring. This could have biased our proposal towards technologies proposed by team members who did more thorough research or who gave higher scores.

A downside of our scoring system, and the removing of constraints, is that the proposal could contain some non-feasible technologies either as the top solution to an opportunity, or as one of the top-scoring technologies overall. This proved the case, as the CAVE system was the fifth highest-scoring overall technology, despite being large, hard to set up, and costing over 5,000,000 Danish Kroner. Removing the size constraint meant it continued through the analysis phase, and overall scoring system allowed for a very capable system like the CAVE to score highly.

## 5.2 Future Work and Recommendations

The problems faced in the completion of this project highlight future work that students can conduct within the Studio or at the Copenhagen Business School. The size and complexity of establishing technological literacy discussed earlier opens up the opportunity of a project to determine this metric at CBS or another school. Defining a metric and a proper survey for technological literacy would be useful in a continuation of this project, as well as across a broad spectrum of projects involving technology. Additionally, the limited usage of email at the Copenhagen Business School and “the right to not be spoken to” in the Danish culture is another aspect that project teams could examine. Being able to devise better ways to get informational surveys would result in a deeper understanding of potential technologies, as well as enhancing other projects in Denmark.

This project resulted in a proposal that presents a handful of technologies that could be useful in improving the Studio upon its transition over to the new location. These technologies are relevant as of the writing of this paper, but might not be the best solutions available years in the future. Many of these technologies may no longer be sold, as other technologies replace them on the market.

On the other hand, the opportunities for technological improvement will likely remain relevant to the Studio. We believe that these technological opportunities are the most important findings from this project, since this proposal can be considered by the Studio at CBS years from now, when more advanced ICTs are available that can further address the opportunities. Additionally, other business studios could reference this proposal when considering technology implementations. Since studios for business students is still a relatively young idea, not much other information exists on the technology that could supplement this type of learning environment. Therefore, our proposal can act as a stepping stone for other business studio faculty to experiment with ICTs and enhance the studio learning experience for business students.

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## Appendices

### Appendix A: Calendars

<b>March</b>						
<b>M</b>	<b>T</b>	<b>W</b>	<b>R</b>	<b>F</b>	<b>Sa</b>	<b>Su</b>
17	18	19	20	21	22	23
Data Collection						
Stefan Meeting		Observe Class (1) Advisor Meeting	Observe Class (2) Interview (3)			
24	25	26	27	28	29	30
Data Collection						
	Interview (1)	Advisor Meeting Interview (1)	Sponsor Meeting			
31						
Data Collection						



April						
M	T	W	R	F	Sa	Su
31	1	2	3	4	5	6
	Data Collection	Distillation of Data		Research ICT		
	Interview (3)		Sponsor Meeting			
7	8	9	10	11	12	13
Research ICT	Analyze ICT		Survey Tech Literacy			Proposal
		Interview (1)	Sponsor Meeting Pretest Students	Pretest Faculty	Analyze Surveys	
14	15	16	17	18	19	20
Proposal		Easter Break				
21	22	23	24	25	26	27
Easter Break	Proposal					
	Survey Faculty for Validation					
			Sponsor Meeting	Analyze Surveys		
28	29	30				
Proposal						
Interview (1)						

May						
M	T	W	R	F	Sa	Su
28	29	30	1	2	3	4
			Proposal			Presentation
					Proposal Due Final Report Due	
5	6	7				
Presentation						
Final Presentation						

## Appendix B: Studio Faculty Interview Questions

Professor Name:

Interviewer(s) Name(s):

Date:

- Introduce ourselves
  - Say what our project is about
  - Confidentiality: Before we start this interview we want to make sure that we have your permission to use any information in which you provide us in our final proposal. We will keep your information anonymous (if desired) and you can stop the interview at any time and you do not have to answer any question you may not be comfortable with. Also, if possible, can we record this interview?
  - Mission Statement: The goal of this project is to aid Copenhagen Business School faculty to create an ideal studio learning environment by identifying the needs of the Studio at CBS and proposing ICT solutions
1. What courses do you teach at CBS? / What is your specialty?
  2. What are the goals of your course/s?
  3. What technologies do you currently use in your classes? Examples may include class capture, smart boards, clickers, etc.
  4. Why do you use the Studio? (What benefits are there to the studio space?)
  5. Are there any problems you've experienced in the Studio? Is there anything lacking?
  6. How would you improve the Studio?
  7. Is there any technology that you would like to see implemented into the new Studio?

8. Is there any technology that you would not like to see implemented into the new Studio?
  - Thank interviewee for his or her time

## Appendix C: List of Interviewees and Relevant Information

<b>Interviewee Name</b>	<b>Information</b>
Anonymous Professor	<ul style="list-style-type: none"> <li>• Professor at CBS</li> <li>• Once taught in the Studio and decided not to return</li> </ul>
Balder Onarheim	<ul style="list-style-type: none"> <li>• Professor at CBS and other universities</li> <li>• Department of Marketing</li> <li>• Teaches Applied Neurocreativity in the Studio at CBS</li> </ul>
Daved Barry	<ul style="list-style-type: none"> <li>• Professor at CBS in the Department of Management, Politics, and Philosophy</li> <li>• Cofounder of the Studio at CBS, teaches courses in the Studio, and is closely involved with the Studio's activities</li> </ul>
David Dunne	<ul style="list-style-type: none"> <li>• Professor of Marketing at the University of Toronto</li> <li>• Founded a classroom space similar to a studio for business education on behalf of the Beedie School of Business at Simon Fraser University</li> </ul>
Karl-Heinz Pogner	<ul style="list-style-type: none"> <li>• Associate professor at CBS and program director in the Department of Intercultural Communication and Management</li> <li>• Interested in conducting activities in the new Studio</li> </ul>
Lena Mygdam Zwisler	<ul style="list-style-type: none"> <li>• Teacher at CBS in the Department of Intercultural Communication and Management</li> <li>• Interested in conducting activities in the new Studio</li> </ul>
Robert Austin	<ul style="list-style-type: none"> <li>• Professor at CBS in the Department of Management, Politics, and Philosophy</li> <li>• Has taught with a summer course with Shannon Hessel in the Studio at CBS focusing on case discussion</li> </ul>
Shannon Hessel	<ul style="list-style-type: none"> <li>• Professor at CBS in the Department of Management, Politics, and Philosophy</li> <li>• Has taught with a summer course with Robert Austin in the Studio at CBS focusing on case discussion</li> <li>• Has experience in theater and set design</li> </ul>
Siv Britt Mansa	<ul style="list-style-type: none"> <li>• Architect in charge of the new Studio's structural endeavors</li> <li>• Has sketches and floor plans of how the new Studio will look</li> </ul>

## Appendix D: Robert Austin Interview Questions

- Introduce ourselves; Leader: Joseph Spicola, Secretary: Rose Petock
  - Say what our project is about
  - Confidentiality: Before we start this interview we want to make sure that we have your permission to use any information in which you provide us in our final proposal. We will keep your information anonymous (if desired) and you can stop the interview at any time and you do not have to answer any question you may not be comfortable with. Also, if possible, can we record this interview?
  - Mission Statement: The goal of this project is to aid Copenhagen Business School faculty to create an ideal studio learning environment by identifying the needs of the Studio at CBS and proposing ICT solutions
1. What courses do you teach at CBS? / What is your specialty?
  2. What technologies do you currently use in your classes?
- Explain the Studio
3. Why don't you use the Studio? Are there any problems you see?
- Thank Rob Austin for his time.

## Appendix E: Shannon Hessel Interview Questions

- Introduce ourselves; Leader: Joseph Spicola, Secretary: Rose Petock
- Say what our project is about
- Confidentiality: Before we start this interview we want to make sure that we have your permission to use any information in which you provide us in our final proposal. We will keep your information anonymous (if desired) and you can stop the interview at any time and you do not have to answer any question you may not be comfortable with. Also, if possible, can we record this interview?
- Mission Statement: The goal of this project is to aid Copenhagen Business School faculty to create an ideal studio learning environment by identifying the needs of the Studio at CBS and proposing ICT solutions
  1. What courses do you teach at CBS? / What is your specialty?
  2. What are the goals of your course?
  3. What technologies do you currently use in your classes (outside the Studio)?
  4. What technologies are you comfortable using in general?
  5. How do you bring art and theatre together in the classroom? Is the Studio a good way to do this?
  6. Is there anything lacking in the Studio?
  7. Do you have any more thoughts on studio learning?
- Thank Shannon Hessel for her time.

## Appendix F: Karl-Heinz Pogner and Lena Mygdam Zwisler Interview

### Questions

- Introduce ourselves; Leader: :Rose Petock, Secretary: Nick Perez
- Say what our project is about
- Confidentiality: Tell them that we will keep their information anonymous (if desired) and that they can stop the interview at any time. Explain that they can opt out of any question.
- Mission Statement: The goal of this project is to aid Copenhagen Business School faculty to create an ideal studio learning environment by identifying the needs of the Studio at CBS and proposing ICT solutions
  1. What courses do you teach at CBS? / What is your specialty?
  2. What are the goals of your course?
  3. What are you looking for in the Studio?
  4. What technologies do you currently use in your classes?
  5. What technologies are you comfortable using in general?
  6. Why don't you use the Studio? Are there any problems you see?
- Thank Karl-Heinz Pogner and Lena Mygdam Zwisler for their time.

## Appendix G: Studio Classroom Observation Note Template

<b>Facilitator:</b>	<b>Describe Activity:</b>	<b>Student Equipment:</b>	<b>Areas of Improvement:</b>	<b>Other Notes:</b>
<b>Subject:</b>		<b>Faculty Equipment:</b>	<b>Possible Constraints:</b>	



## Appendix H: Studio Student Conversation Questions

- What do you do in this particular course/program?
- Do you take any other courses at the Studio?
- Do you enjoy the Studio classes?
- Is there anything you'd want to change about the Studio?

If we discuss our project and its goals, the following questions may be relevant:

- Can you see some technology being beneficial to the Studio's activities?
- Do you know of any technologies that you would like to have access to in the Studio?

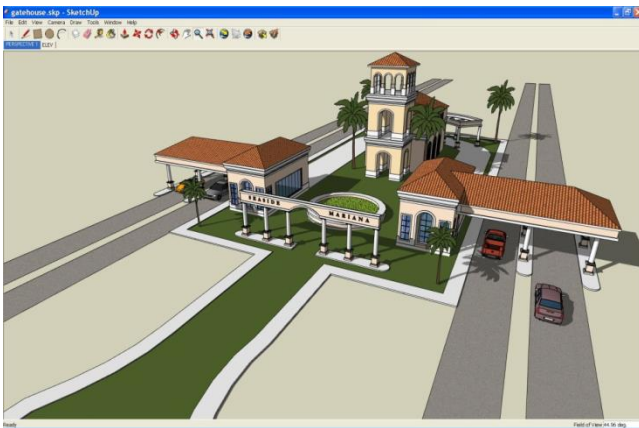
## Appendix I: New Studio Space Visiting Notes

<b>Measurement of room:</b>	<b>Noticeable Features / Other:</b>	<b>Drawing of the layout:</b>	<b>Plans:</b>
<b>Number of outlets:</b>			

## Appendix J: Professor Validation Surveys

We are considering the following technologies to be used in the Studio at CBS. Would you be comfortable using or learning how to use the following technologies to aid in instruction or class work?

### 1. SketchUp



Sketchup is a simple modeling software that streamlines the process of creating 3D models on a computer. One can create 2D drawings or import shapes, then drag them into a 3D shape. There is also a large database of models that can be imported into the program, and the models can be sent to a 3D printer to create a physical model. It is a useful tool to visualize one's ideas easily.

- Yes
- No

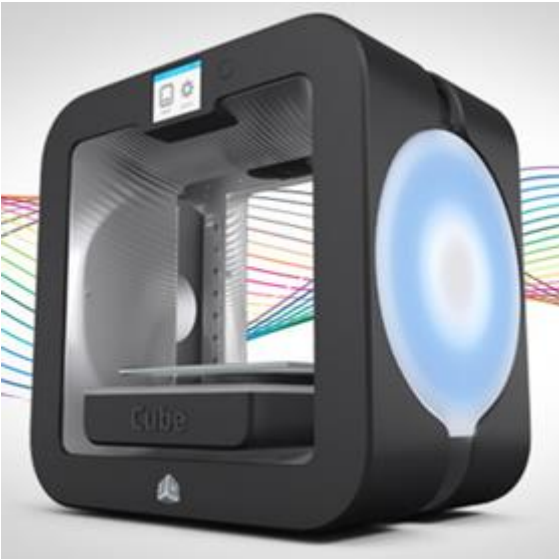
### 2. Pirate3D Buccaneer



This 3D printer allows the user to design a model in its multiplatform (PC and Mac, iOS and Android) app called SmartObjects, then send the model wirelessly to the printer over Wi-Fi. It is desk-sized, so it can fit in an office or a classroom easily.

- Yes
- No

### 3. Cubify Cube 3



This 3D printer allows the user to design a model in its multiplatform (iOS, Android, and Windows) app, then send the model wirelessly to the printer over Wi-Fi. The touch screen allows users to search the company's large database of objects and find a model to print, without the use of external hardware (such as a computer). It is desk-sized, so it can fit in an office or a classroom easily.

- Yes
- No

### 4. FlexCat



FlexCat is a 4 to 6 piece audio system that provides two-way communication for small group instruction. Teachers are able to listen in and communicate with each group through a central monitoring speaker.

- Yes
- No

## 5. eBeam Engage



The eBeam Engage is a magnetic receiver (pictured on the left side of the picture) that one can place on the side of a whiteboard, then plug into a computer. Pairing the eBeam Engage with a projector allows the whiteboard to become an interactive presentation tool. It also includes a remote control with a full keyboard, touch pad, and page scrolling buttons, for manual, physical control. Other features include a speaker to play audio from a computer or music playing devices, a microphone to record presentations, and a scroll knob to navigate presentations.

- Yes
- No

## 6. NearPod



A professor can open the NearPod app on their device (tablet, phone, laptop), and press the “start class” button. Students can then open the app on their devices and input a class ID PIN. Professors can then share screen content with students, such as PowerPoints, webpages, and graphics.

- Yes
- No

## 7. SurveyMonkey

### Harvard Graduate School of Education Pre K-12 Parent Survey Template

In this section, we'd like to learn more about your perceptions of your child and your child's interactions with his/her school.

29. How well do the teaching styles of your child's teachers match your child's learning style?

- Not well at all
- Mildly well
- Fairly well
- Quite well
- Extremely well

30. How often does your child struggle to get organized for school?

- Almost never
- Once in a while
- Sometimes
- Frequently
- Almost all the time

31. At your child's school, how well does the overall approach to discipline work for your child?

- Not well at all
- Mildly well
- Fairly well
- Quite well
- Extremely well

SurveyMonkey is a free, easy to use survey tool. The user is able to make surveys, each with various types of questions. Automatically send the survey to up to 100 people.

Yes

No

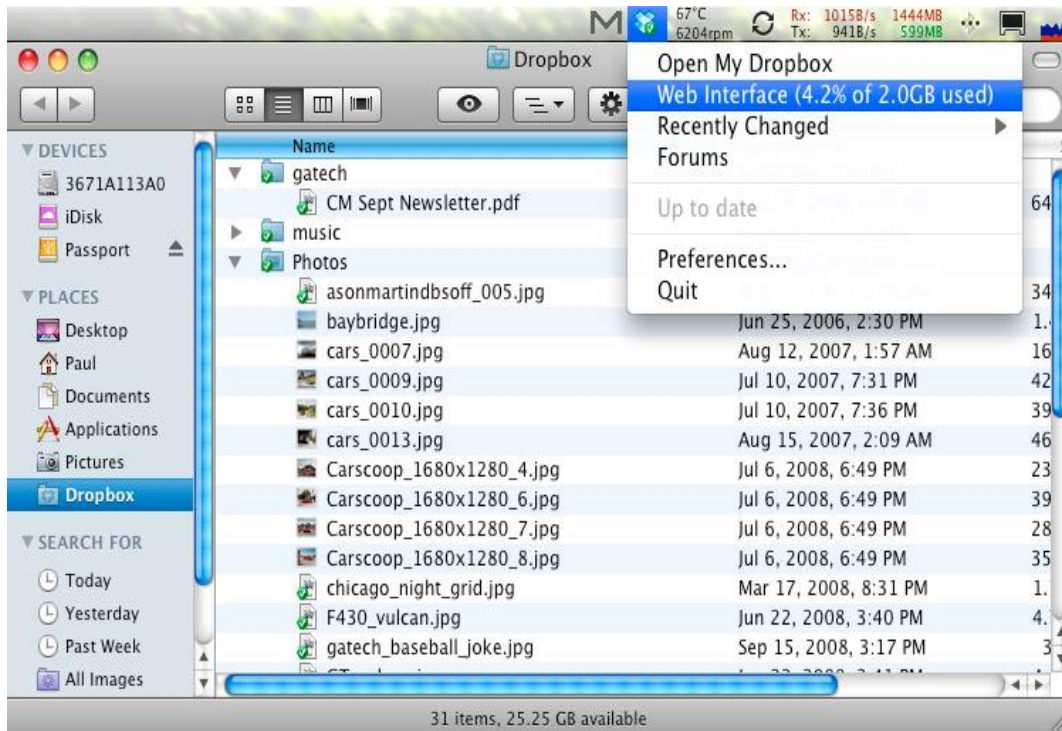
## 8. Google Forms

Google Forms is a free, easy to use survey tool. Create a survey by specifying the type and content for each question. The user can easily send the survey to an email list.

Yes

No

## 9. DropBox

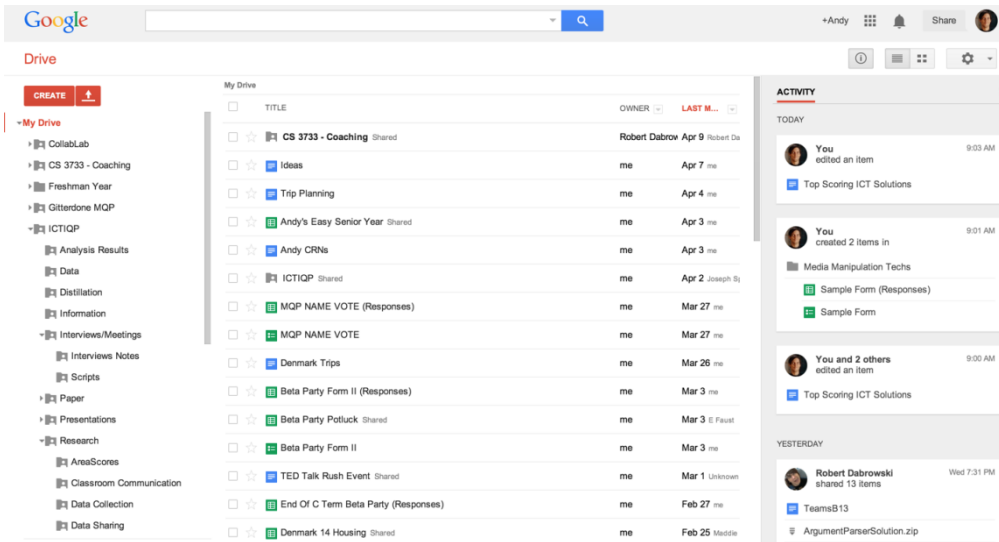


To use DropBox, download the desktop application, open it, sign in, and save files to your Dropbox folder (just like saving to your Desktop or any other folder). Files are now saved on a server - you can log into dropbox.com and access these files from any computer. The program can be used to share documents with students - right click on a folder or document, hit "Share" and put their Dropbox username or email.

Yes

No

## 10. Google Docs



Create or upload files and folders to your Google account. Share with other students by hitting “Share” and putting in their emails. The user can also collaborate on documents live with other users

Yes

No

## 11. eBeam Edge



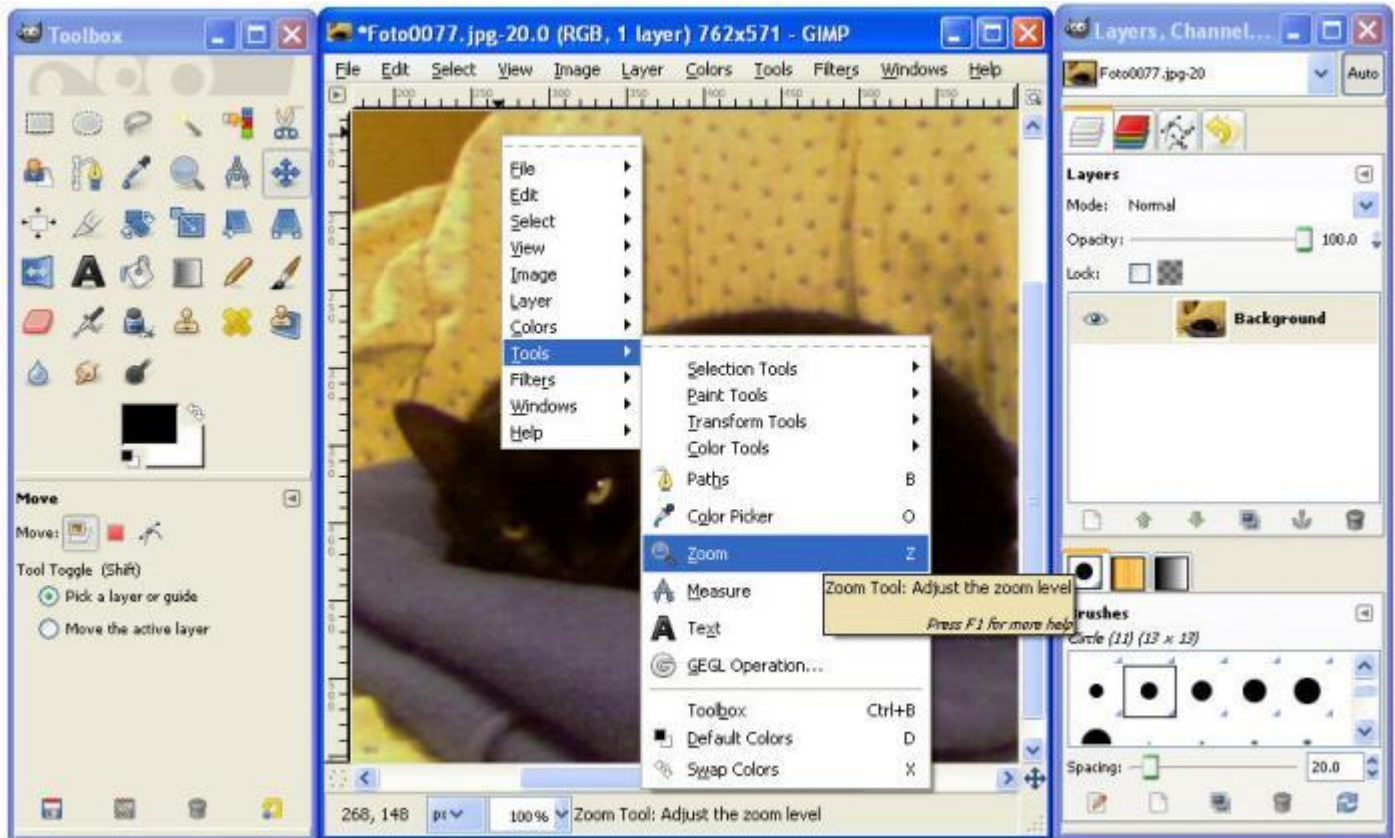
The eBeam Edge is a magnetic receiver (pictured on the left side of the picture) that one can place on the side of a whiteboard, then plug into a computer so that the actions performed on the whiteboard (drawing with markers, tapping the board with their included stylus) are translated to the computer. It lacks physical controls, instead relying on being controlled through the software. When paired with a projector, the whiteboard can become an interactive presentation tool.

Yes

No



## 12. Gimp



Gimp is free photo editing software that aims to replicate the functionality of Photoshop. It includes tools for layering, shading, and coloring.

- Yes
- No

### 13. BenQ MW23



The BenQ MW23 is classroom projector with a 1280x800 resolution used to display images onto a large flat surface.

- Yes
- No

### 14. Epson EX 6220



The Epson EX 6220 is classroom projector with a 1280x800 resolution used to display images onto a large flat surface.

- Yes
- No

## 15. Echo360



Echo360 is a lecture capture system which enables faculty to record audio, visuals, and video for students to access online in a digital format. Once installed, faculty need to select start recording, they will need to configure their microphone, and set a title for their recording. Captures are started, stopped, and paused by pressing start capture, pause capture, and stop capture, respectively. To publish the recording, all the user needs to do is press the "publish recording" button.

- Yes
- No

## 16. GoPro Hero3



GoPro is a durable, waterproof, mobile, high-definition camera. It comes with a mount that allows it to be attached to various surfaces, including your head, a wall, or a bike. It has built-in Wi-Fi, allowing for remote recording and control.

- Yes
- No

## 17. Launchkey



The Launchkey is a synthesizer-style keyboard with a launchpad (the yellow and green buttons) and sliders that allows the user to activate and deactivate tracks while playing. It automatically detects and maps to most software when connected to a computer, or one could connect it to an iPad or computer and use their Novation Launchkey app. It is a very useful tool for creating or recording music with studio-like features.

- Yes
- No

## 18. Launchkey Mini



The Launchkey Mini is a synthesizer-style keyboard with a launchpad (the yellow and green buttons) allows the user to activate and deactivate tracks while playing. It automatically detects and maps to most software when connected to a computer, or one could connect it to an iPad or computer and use their Novation Launchkey app. It is a very useful tool for creating or recording music with studio-like features, and it is portable so one could easily transport it across a room, or across a city. As the “mini” version, it has reduced functionality, but requires less customization.

- Yes
- No

## 19. Samsung TV Cam (VG-STC3000)



This camera connects to any TV or display using a USB port, allowing the user to access Skype.

- Yes
- No

## Appendix K: Interview Notes

### K.1 Balder Onarheim Interview Notes

Key:

Suggestions of ICT Solutions

Technological Opportunities

Constraints

- Balder is a lecturer at CBS and other universities/companies.
  - Teaches Applied Neurocreativity in the Studio
  - They work with neuroscientists to teach business students to work creatively
- Current technologies used in classes outside of the Studio:
  - Projector
  - TV
  - Sound equipment
  - Clickers are used well in lecturing
- Balder uses the Studio for its flexibility and informality
  - Teams can work well in groups there (they can move tables, sit in couches, collaborate with other groups)
  - Informality “changes the scene” which impacts students’ creativity
- Requests for the new Studio:
  - Keep the coziness

- There is a similar course (to Applied Neurocreativity) being taught in a lecture hall and it has different results from the Studio course
  - The acoustics in the current Studio are terrible
    - You can have two groups in one space, which makes it loud and distracting. It makes it impractical to use one room as a workspace for two groups.
- The studio learning style is applicable to other fields
  - IT fields
  - Social sciences
  - The Studio is not topic-based
- Technological equipment used in Studio lessons:
  - Mindflex duel
    - A game where you roll a ball around with your mind
    - Cheap product from Amazon
  - Emotiv Headsets
    - Relatively cheap (a few hundred dollars)
    - Students have hacked this product to read brain activities on their phones
    - Research into controlling a helicopter with one's mind
- Non-technological equipment used in Studio lessons:
  - Post-it notes
  - Whiteboards and dry erase markers
- What technology Balder would like to see implemented in the new Studio:
  - Not too much technology, might distract from the informal environment

- Clickers are a tried and true technology
- Something useful for him would be field study kits
  - A small kit with a camera and projector
  - Can gather information and come back to present it
- What technology Balder would not like to see implemented into the new Studio:
  - He tells students not to use their own technology (phones, laptops, tablets, etc.) to keep it hands on
  - Technology adds constraints to the activities. The team shouldn't add constraints to studio environments
- Bo T Christensen has a project about technologies to support creativity in schools
  - Could be useful information for the project



## K.2 Shannon Hessel Interview Notes

Key:

### Suggestions of ICT Solutions

### Technological Opportunities

### Constraints

- Shannon Hessel has taught in the Studio
  - Taught a summer class with a three hour case discussion
    - She leads the discussion
    - Then students split into groups to discuss cases
  - Co-teaching with Rob Austin and Stefan Meisiek
  - The studio has many international students, so the courses are taught in English
  - Teaches Organizational Entrepreneurship with Innovation and Art
    - This course teaches how to get a competitive advantage through design and art
    - Helps students understand the creative process
    - She runs group projects and group work that parallels the students' ideas
- Technologies currently used in classes outside the Studio
  - Wikis
    - Wikis offer information on new technology and behaviors, how they are being used, and improvements on human life in the future.
    - An example is 'smart clothing'

- Audiobooks
- Videos
  - i.e. Ted Talks
- Technologies Shannon would like to use:
  - Live tweets
    - **Communication from students to professor** without speaking in front of the class or interrupting the class flow
  - **Wall where you can have a screen with different aesthetics**
    - For example, a wall that can be a waterfall
    - Can change to other environments too
  - VIP
    - A showroom that communicates the values of a company
- The Studio is a great environment to combine art and theater with management
  - Shannon uses exercises from her arts background to assist in making management decisions
    - i.e. using roleplaying to help with realism and thinking in others' shoes
  - There is always a reason for **conversation with students**
    - This is how you figure out what students want
- How she believes the design of a classroom or space can affect learning:
  - Traditional classrooms interfere with case discussions
    - Classrooms facing in one direction are not like the Danish culture, some students cannot even see the lecturer
    - There are fights for rooms where you can move tables and chairs

- CBS does not have that many great teaching spaces
- Shannon struggled with the current Studio
  - She likes to talk to the whole group, then move, then talk to the whole group again, then move again
  - Studio in its current state doesn't facilitate that very well
- Big classrooms have better acoustics than smaller ones
- What Shannon believes is lacking in the Studio:
  - The ability to adapt known material to the Studio
    - Stefan said that she had to use the Studio, and she was not used to using it
    - Two classes went really well, one class went terribly
  - The Studio could use a **PA system**
    - Easier to have students transition from individual groups to a large group
  - Can't really use it efficiently for **case discussions**
    - However, she will try this summer to use it for case discussions
- Shannon's suggestions for the new Studio:
  - Wants stacks of magazines
    - She is sick of post-it note colors
    - She wants more materials besides post-it notes and whiteboards
  - **Low-tech solutions are just as important as high-tech**

### K.3 Robert Austin Interview Notes

Key:

Suggestions of ICT Solutions

Technological Opportunities

Constraints

- Robert Austin does not teach in the Studio.
  - He teaches in a Harvard Case Study Style.
  - Teaches the same class as Shannon Hessel (Leadership in 21<sup>st</sup> Century Organizations).
  - The class is going to become a MOOCs course, maybe in partnership with Harvard.
  - He is part of the IT Management Department.
- Goals of his courses:
  - Conduct creative activities and relate them to having a competitive advantage
  - Teach students about the ‘creative economy’
- Robert’s current uses of technologies:
  - Wikis
    - Students can share new technology, art, artwork, videos.
    - People in creative processes make things that they think are cool and email it to professors.

- Creates a dynamic server and there is a standard of ‘coolness’ on the wikis that students try to match.
- Audiobooks
- Films and videos of lectures
  - He has a whole box of DVDs, tapes, and recordings.
  - Uses videos from interviews or research videos.
  - Uses these recordings interactively to promote discussion in the classroom.
- Skypes into classrooms for interaction with students
  - He has run into some small difficulties, but overall it is a good experience.
  - Sometimes it tends to make people repeat things to be heard through the microphone.
- Technologies that Robert is comfortable using / would like to use in his courses:
  - Live tweets
    - To promote interaction between students and professors during class.
    - He likes to follow people on twitter.
  - Video prototyping
    - There is a potential for using video at the Copenhagen Institute for Interactive Design.
  - It could be useful to set up a screen to connect to other places
    - i.e. Spend an hour of communication with WPI, then spend an hour of communication with RSID.
  - The CAVE system

- A system of projections on walls that creates a fly-through space.
- One could walk through 3D places and experience data from an internal perspective.
- Why Robert does not use the Studio at CBS:
  - He is busy working on MOOCs and does not have time to figure out what to do in the Studio.
  - He can't use the Studio for case discussions, which is what makes up the majority of his courses.
- Thoughts on using MOOCs and studio learning together:
  - He hasn't personally figured out the platform of MOOCs and is in the process of figuring it out.
  - He is not against the idea; however, it's not currently in his plans.
  - He would like the Studio to incorporate aspects that are theater-related, such as professional actors.
  - He would also like a virtual studio where people are placed in discussion groups.

## K.4 Daved Barry and Frederik Fog Interview Notes

Key:

### Suggestions of ICT Solutions

### Technological Opportunities

### Constraints

- How Daved began studio learning:
  - He taught strategy at Syracuse and thought it was boring
  - His background was in the arts; he studies music and plays three instruments
    - Also was a painter at one point
    - Went to culinary school and dropped out
  - Began making pop-up studios using movable seats
    - He tested this education style with seniors and MBAs
    - He would ask MBA students to draw their strategies
      - Students solved a case ‘out loud’, then drew out the case, and compared the drawing with their analysis of the case
      - This led to students analyzing the case very carefully and precisely
    - He planned his classes around group dynamics
      - Groups worked together and see what happens (students would often fight for leadership)
      - He would then ask students to draw their groups
        - The results showed how the group works and collaborates

- One could see if there is defensiveness or openness in the group
  - It is used as a developmental tool
- Another strategy was to use 'human sculptures'
  - The students would physically act out a sculpture
  - They become the problem so it is more clear how it would be to change
- Wanted to work with 'stuff'
  - Cardboard, tape, other crafting items
  - Students would use the items to sculpt problems and see where it leads
- Daved's task for the US Army
  - Wanted to set up a strategic planning system at a big fort in upstate New York
  - There were huge civilian group wars (civilians hated soldiers and soldiers hated civilians)
  - He put the people who experienced conflict together with materials such as paint, tissue paper, glue, etc. and had them build a model representing the current state of the fort
  - Most of the people drew and built unhappy and depressed works of art, which reveals a lot about their thoughts on the fort
  - He then made the people build a sculpture for the ideal organization of the fort



- They made cute, tiny, attractive sculptures
- They proved to have hand talent
- They had the skills, but the some of the sculptures were ugly because the organization was ugly
- He asked how the fort can transform from the first sculptures to the second sculptures, and the implementation of these ideas led the fort to be a model for army forts in the US
- He saw how management was taught as a science
  - He wondered: how do we perform strategy? How do we perform leadership? How can we use theater within management?
- He ran a program called the “Looking Glass”
  - Those who partook in this program acted as a CEO, then would reflect and look back at yourself
  - The whole program is filmed and runs for one or two days, where a lot of emotions are at play and a lot of decisions need to be made
  - The next week is spent reviewing the films and reflecting on how the participants acted
  - Daved was shocked with how well this program was received
- Daved’s thoughts on the Studio at CBS:
  - He believes it is important for management education
  - Studios can be conducted anywhere in the world; it isn’t always a physical space
  - Studio learning is “learning by making”

- There is more than case-based learning and problem-based learning; the key is making something
- Studio learning cuts across working styles (such as mixing analysis with crafting, individual work with group work, play with non-play, and socializing with non-socializing)
- He wants students to have skills in making stuff to aid in their improvisation skills, which helps in making new businesses
- The Studio doesn't make sense for theory, but helps develop style and ways of doing, seeing, and approaching things
- How Daved would improve the Studio:
  - Technology that could help with the looking glass program
    - This involves capturing videos of the activities
    - It also involves apps that can be used inside and outside the Studio
  - He would like the class capture, but easy to use
    - Would like it to be recorded in real time
    - Should be easily compacted and editable (so he is not left with a two-day long video)
  - Would like to implement simulation, but no other professors will do it with him
    - Thousands of computer simulations are available, but they don't have a personal feel to them
    - There are simulation programs for leadership, strategy, organizational design; there is a whole library of them
  - JADE software

- A cloning software to clone a hard disk in a very fast and reliable way
- Technological equipment that Daved has used in his lessons:
  - He once used a portable microphone for a huge class
    - He wanted students to be able to speak into it so the whole class could hear
    - It turns out no student wants to say anything in front of 600 people
    - It would help to have more private conversations with students instead of speaking in front of a crowd
- Technology that Daved would like to implement in the new Studio:
  - A virtual studio
  - He might like a soundboard
- Technology that Frederick suggests:
  - Something to engage people
  - Individual iPads that can be used to quickly ask questions to a speaker
  - Clickers do not engage students as well as some faculty think
  - Have students bring in their own devices and use a common application
    - WICER is the application
  - Not every student is comfortable raising his or her hand, but people are more comfortable participating through technology
  - It does not put students on the spot; it can be completely anonymous

## K.5 Karl-Heinz Pagner Interview Notes

Key:

### Suggestions of ICT Solutions

### Technological Opportunities

### Constraints

- Pagner's role at CBS:
  - He is an academic program director for business communication
  - He teaches Digital Communication and Media classes
  - Conducts organization communication research
  - Also does research on world exhibitions as communication
  - He has used the Studio once for a workshop with the advisory and study board
    - He was not teaching, but was invited for the workshop
  - Teaches a course called Crisis Communication
    - The class has four characteristics: it is interactive, international, virtual, and has life scenarios
    - Course consists of 25 CBS students, and 25 students of a different country
    - The students must work across international boundaries in groups (two students in Denmark, two students in the other country)
    - The course will address management crises with random twists, such as political events or terrorism
    - The course concludes with reflection, research, and theory

- How he would improve the Studio:
  - He would like there to be **visualization software**
  - Would want **“individual online closed courses”**
- Pogner’s thoughts on how students learn:
  - “We cannot teach very much, but students can learn very much.”
  - You can only ‘teach’ standards (i.e. Fixing a car. It is a standard problem with a standard solutions)
  - Instead of ‘teaching’, provide **opportunities to ‘experience’**
  - Reflection on projects is valuable for this experience
  - Businesses want to hire an academic to find out what ‘ill-defined’ problems are so they can generate a solution, then the students will be able to use those skills in the workplace
- Pogner’s specific suggestions:
  - Look up NodesAgency.com, an app developer
  - **Panopto**, a lecture capture software
  - There is no real support at CBS for a tech problem
    - The IT people will simply say “we don’t know”
    - **Techs *have* to be easy and reliable**
    - He once had a video conference about digital communication and the conference failed
  - “Technology is good, but there **has to be a pedagogical reason** for it to be there.”
- **Moodle** takes video casts, class discussions, and sounds for students who live abroad

## K.6 Lena Mygdam Zwisler Interview Notes

Key:

### Suggestions of ICT Solutions

### Technological Opportunities

### Constraints

- Lena's role at CBS:
  - She is a teacher
    - Practices communication from the business world
    - Focuses on both internal and external communication
    - Teaches students how to use all social platforms for communication
  - Heavily involved with the communication workshop that is a floor above the new Studio
  - She tries to make a connection between studying theory and real-world experience (similar to internships)
  - She is looking to reinvent her communication workshops by making them more creative
    - Looking into the Studio to help achieve this goal
- Why Lena is looking into the Studio:
  - She likes the flexibility of the Studio space
    - There are moveable tables
  - It could help connect theory and practice

- Technologies that would help Lena in the new Studio:
  - A connection between business and CBS
  - Having a workshop space
    - Using it to work on real, ill-defined problems and making a deliverable to be used
  - A way to have different courses progress through a single problem simultaneously but independent from each other

## K.7 Anonymous Professor Interview Notes

Key:

### Suggestions of ICT Solutions

### Technological Opportunities

### Constraints

- This professor does not use the Studio too much because it is a house.
  - It isn't equipped to do what he wants
  - Classes at the Studio feel more like meetings
  - He believes it is a great space for discussion, but not a good space for doing
- Suggestions for technologies that can be implemented in the Studio
  - Computers
  - Laser Cutters or a CNC machine for physical modeling
    - Things that can cut or shape material
  - Technology for digital or physical artifacts
    - i.e. mockups for services provided by a startup
  - Technology that assists in startup incubation
  - Some sort of video or illustration software
  - A tool to mine open data, or other data tools
  - “Toolshed” tools could help
- This professor would like a lab / inventory space

“Technologies should promote communication, not prohibit it”



## K.8 David Dunne Interview Notes

Key:

### Suggestions of ICT Solutions

### Technological Opportunities

### Constraints

- David owns a studio called “Radiance”
  - The studio started two years ago
  - He says that calling it a “Studio” is an exaggeration
  - He had a small classroom, but adapted it into a minor design space
  - He founded this classroom to have a “way for taking process as design” and “incubating as entrepreneurship”
  - It is not as much about the classroom, but more about the incubation process
- Radiance’s current technological state:
  - It did not have much tech
  - It had projectors for lecture
  - Had posters, drawings, and other art
- Improving the current technological state at Radiance:
  - ‘Sharing’ technology was very important
    - BaseCamp
    - Google Drive
    - DropBox

- Video Conferencing is also important
  - Skype
  - Google Hangout
- TU Delft is a technology university in the Netherlands
  - Laura Quayle may be a helpful contact
  - They have interesting theater design and physical structure
    - Had rotating and rollable desks to enable group forming
- David's suggestions of Technology
  - In an ideal world, a virtual brainstorming room would be very helpful
    - Teams can run brainstorm sessions
    - Can see 'post-its' on-screen
  - 3D printing
    - This has a dispersed team accessibility
    - Requires 3D modeling software
    - Quicker prototyping = better
  - Collaboration technology
  - Figure out how major multinational companies with major design areas communicate
    - If they have dispersed teams, how are the teams communicating and sharing data
  - Whiteboard capturing technology
    - A facilitator writes on a whiteboard, someone takes a picture, picture is circulated to other people

- This method is not easy or ideal
  - Take writing and convert it into text or a picture
  - Ideally, it could convert mind maps to a digital, editable mind map
- David is available to run ideas by and he will comment on them

## Appendix L: Removed ICT Solutions

<b>Reason for not Considering ICT Solution(s)</b>	<b>Effected ICT Solutions</b>	<b>Description</b>
<b>Irrelevant / Not in the Scope of the Project</b>	JADE Software	This is a software business-level database management system which, while optimal for businesses, is meant for other classes not taken in the Studio.
	CNC Machine	This is an invasive, expensive, and difficult to use technology that would not suit the Studio's needs.
	Power Tools	Not considered an ICT
<b>Unfeasible to Find</b>	Wicer Phone App	Research on the Wicer phone app was not successful; it could not be found.
	Individual Online Closed Courses	This technology was based on the success of Massive Open Online Courses, and the team was unable to find technologies that support this adaptation.
	Case Study Method Adaptation	Creating or finding technology of this type was unsuccessful.
<b>Already Solved</b>	Lighting	Stefan already has plans for implementing lighting in the new Studio.
	TVs	TVs currently exist in the Studio, and Stefan will bring them to the new Studio space.
<b>Overlooked in Distillation</b>	Panopto	The team did not find this ICT suggestion in the raw data. Upon reviewing the data, team members found this technology but did not have time to research and analyze them.
	Moodle	The team did not find this ICT suggestion in the raw data. Upon reviewing the data, team members found this technology but did not have time to research and analyze them.

<b>Overlooked in Research</b>	Portable Projectors	Portable projectors (projectors that are at most the size of a brick) did not appear during the research phase. Stefan mentioned this solution after the data analysis phase, where the team decided there was not enough time to properly research them.
<b>Received after Analysis</b>	Basecamp	David Dunne suggested this ICT after the analysis phase was complete. While it may be a valid solution, it cannot be included in our results.

## Appendix M: Removed Technological Opportunities

<b>Reason for not Considering Technological Opportunities</b>	<b>Effectuated Opportunities</b>	<b>Description</b>
<b>Irrelevant / Not in the Scope of the Project</b>	Acoustics	Acoustics is currently a matter of Stefan and the architects' concern, and it is much more of an infrastructural problem than a lack of technology.
	Startup Technology	This opportunity for technological improvement is ill-defined and difficult to research, so the team opted to remove it.
	Theater-related Technology	This opportunity is ill-defined, and many ICT solutions that fell under this opportunity also fell under other opportunities.
<b>Combined Elsewhere</b>	Wall with Changing Appearance	This technological opportunity was similar enough to "Presentation Displays" that the team decided that this was irrelevant.
	Presentation Audio	This opportunity included ICT solutions that were better suited for other technological opportunities, such as "Accessible Sound System" and "Communication"
<b>Already Solved</b>	Presentation Audio	The new Studio has an integrated speaker system and the current Studio is in possession of an iHome, both which would be suitable solutions to this technological opportunity.
<b>Received After Analysis</b>	Virtual Brainstorming	David Dunne suggested this technological opportunity to the team after the analysis phase was completed. Due to time constraints, this opportunity could not appear in the results.

## Appendix N: Research Results

### N.1 3D Visualization – Digital

<b>Sketchup</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• A simple program to make 3D models on a computer</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Can use it to visualize ideas in a 3D space</li> <li>• The files can be saved as .stl files and sent to a 3D printer</li> <li>• One can make their own shapes and models, or import 3D models and place them anywhere in their space</li> <li>• Available for PC and Mac</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Little evidence of glitches</li> <li>• They have tech support</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Simple program but not beautiful</li> <li>• The simplicity helps the ease of use</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Straightforward user interface</li> <li>• Intuitive commands</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• A simple download and installation process for students</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• Free for basic version</li> <li>• 210 dkk per laptop per year for pro version</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 5 out of 5</li> </ul>
<b>Website</b>	<a href="http://www.sketchup.com/">http://www.sketchup.com/</a>
<b>SolidWorks</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• A computer aided drafting (CAD) program</li> <li>• Has analysis tools (unnecessary for the Studio's goals)</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Only available on PC</li> <li>• Can download premade files from the internet and edit them</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Intensive on computer hardware</li> <li>• Have active tech support</li> <li>• Not many bugs</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Generally pleasant appearance</li> <li>• Not necessarily a 'studio' feel</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Has a high learning curve</li> <li>• Students often have to take classes or online courses to learn it</li> <li>• Relatively intuitive and straightforward for CAD software</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• A large but simple download and installation process for students</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 809 dkk per laptop per year</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4.5 out of 5</li> </ul>
<b>Website</b>	<a href="https://www.solidworks.com/">https://www.solidworks.com/</a>

## N.2 3D Visualization – Physical

<b>Cubify Cube 3</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Small 3D printer designed for desktop use</li> <li>• Uses recyclable ABS and compostable PLA plastic</li> <li>• Connects to a computer via USB or Wi-Fi</li> <li>• Offers app for iOS, Android, and Windows phone that allows users to browse models, prepare them, and print them wirelessly via Wi-Fi</li> <li>• Has a color touchscreen UI</li> <li>• Claims to print twice as fast as competitors</li> <li>• Build Volume: 15cm all dimensions</li> <li>• Overall Size: 34cm x 34cm x 28cm</li> <li>• Available in 2<sup>nd</sup> quarter of 2014</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Has a server with many premade models, available to print without a computer using the touchscreen</li> <li>• Works with most smartphone operating systems, Mac, and PC</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Offers support on the website</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Has a creative design that could fit in a studio environment</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Claimed that the touchscreen and app are very intuitive</li> <li>• Claim it is easier to change its filament than it is to change ink cartridges in a standard printer</li> <li>• “certified-safe” for children 8+</li> <li>• Has to convert files to a .CUBE file, converter is included in the software</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Has to be implemented with internet to get full, intended use</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 5395 dkk</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• None (not available yet)</li> </ul>
<b>Website</b>	<a href="http://cubify.com/en/Cube">http://cubify.com/en/Cube</a>
<b>Peachy Printer</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Small 3D printer for flexible</li> <li>• Cheapest 3D printer available</li> <li>• 3D prints from software specifically designed for the device (it converts a digital model into sound waves that move a laser, the laser solidifies liquid below)</li> <li>• Layer resolution: 85 microns</li> <li>• Build Volume: variable (depends how far away the laser is from the liquid)</li> <li>• Overall Size: variable</li> <li>• Not much information as it is not sold as a commercial product yet</li> </ul>



<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Very flexible with a variable build space</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• No information on reliability</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Interesting type of design</li> <li>• Could fit in a studio</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• The software looks complicated</li> <li>• Creator believes the printer will be easy to use when it is finalized</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Needs extensive setup to work properly</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 540 dkk (an assembled version will cost more)</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• None (not on the market yet)</li> </ul>
<b>Website</b>	<a href="http://www.peachyprinter.com/">http://www.peachyprinter.com/</a>
<b>Pirate3D Buccaneer</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Small 3D printer designed for desktop use</li> <li>• “World’s friendliest 3D Printer”</li> <li>• Layer resolution: 85 microns</li> <li>• Build Volume: 14.5cm x 12.5cm x 15cm</li> <li>• Overall Size: 25.5cm x 25.5cm x 40cm</li> <li>• Available in June 2014</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Comes with 3D model software (SmartObjects) to design objects and send wirelessly to the printer via Wi-Fi</li> <li>• SmartObjects works on iOS, Android, Mac, PC, and Linux</li> <li>• Also prints any .stl files</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Claimed to have very few jams due to a patented nozzle that allows for even head distribution</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Very sleek design</li> <li>• Stainless Steel</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• SmartObjects is claimed to be intuitive</li> <li>• Any 3D model software will have some learning curve</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• For full use, must be connected to Ethernet or Wi-Fi</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 2685 dkk</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• None (available in June 2014)</li> </ul>
<b>Website</b>	<a href="http://pirate3d.com/">http://pirate3d.com/</a>
<b>Printbot Assembled Simple</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Small 3D printer designed for desktop use</li> <li>• Fan included to cool the plastic</li> <li>• Layer resolution 100 microns</li> <li>• Build Volume: 15cm all dimensions</li> <li>• Overall Size: 51cm x 25.5cm x 30.5cm</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Folds to easily store or transport</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Support has a large presence</li> </ul>

<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Looks unappealing and complicated</li> <li>• Wouldn't fit in very well in a studio</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Higher learning curve</li> <li>• Have to rely on a separate 3D printing software, adds an extra step in the printing process</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Just needs an outlet</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 3232 dkk</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 3 out of 5</li> </ul>
<b>Website</b>	<a href="https://printrbot.com/shop/simple-white-assembled/">https://printrbot.com/shop/simple-white-assembled/</a>
<b>Ultimaker Original</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Small 3D printer designed for desktop use</li> <li>• Fan included to cool the plastic</li> <li>• Layer resolution 20 microns</li> <li>• Build Volume: 21cm x 21cm x 20cm</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Has a controller attached so the user can guide the machine and print whatever they would like</li> <li>• Large build volume</li> <li>• Open source (one could find a virtually limitless number of files online)</li> <li>• Upgradable</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Reviews say it is very reliable</li> <li>• Replacement parts are low cost and easy to replace</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Not very attractive, might not be suitable for a studio</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Higher learning curve</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Just needs an outlet</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 7359 dkk</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 3.5 out of 5</li> </ul>
<b>Website</b>	<a href="https://www.ultimaker.com/pages/our-printers/ultimaker-original">https://www.ultimaker.com/pages/our-printers/ultimaker-original</a>
<b>XYZprinting daVinci 1.0</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Small 3D printer designed for desktop use</li> <li>• Modeling software available: grants access to thousands of free 3D models, the user drags and drops in to a virtual space where he or she can edit it (scale, move, rotate, etc.), choose material color, then send to printer</li> <li>• Connects to a computer via USB</li> <li>• Build Volume: 20cm x 20cm x 20cm</li> <li>• Overall Size: 46.5cm x 51cm x 56cm</li> <li>• Available in June 2014</li> </ul>

<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Has a large build volume</li> <li>• Offers thousands of models</li> <li>• Can easily edit models</li> <li>• Works with Mac and PC</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Gone to lengths to ensure safety</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Looks like a workshop machine, not necessarily a studio machine</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Designed to be very easy to replace filament</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Offers support to install the printer and set it up</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 2692 dkk</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 3.5 out of 5</li> </ul>
<b>Website</b>	<a href="http://www.xyzprinting.com/en/product">http://www.xyzprinting.com/en/product</a>

## N.3 Accessible Sound System

<b>Apogee MiC</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• A USB-Plugin microphone</li> <li>• High Quality Sound Recording</li> <li>• 3.81 cm x 3.81 cm x 11.43 cm</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Small</li> <li>• Meant for mobility and transport</li> <li>• Works best with Garageband, although other software works just as well</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• All metal design</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Similar design to higher end microphones</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• “Just plug it in, turn on Garageband, turn on Apogee MiC, hit record in Garageband, and start recording”.</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• No set up necessary</li> <li>• Only need is a software to record with (Garageband)</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 1079.02 Danish Kroner</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4.5/5.0</li> </ul>
<b>Website</b>	<a href="http://www.apogeedigital.com/products/mic">http://www.apogeedigital.com/products/mic</a>
<b>Blue Microphones Snowflake</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• USB-plugin</li> <li>• No additional software needed</li> <li>• Laptop clip for attachment</li> <li>• Small, non-intrusive design</li> <li>• 7.62 cm x 5.08 cm x 5.08 cm</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Can plug into different devices through USB</li> <li>• Can be used by multiple software</li> <li>•</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Customer’s Snowflakes sometimes (rarely) arrive not working, but Blue Microphone will replace if that’s the case</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Small, unobtrusive</li> <li>• Metal design</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Plug in and use</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• No installation needed</li> <li>• No software installation needed</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 296.73 dkk</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4.0/5.0</li> </ul>
<b>Website</b>	<a href="http://bluemic.com/snowflake/">http://bluemic.com/snowflake/</a>

<b>Bose SoundLink Mini Bluetooth Speaker</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Bluetooth wireless speaker</li> <li>• 5.08 cm x 5.84 cm x 18.03 cm</li> <li>• High-quality speaker</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> <li>• Any Bluetooth device</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Durable</li> <li>• Fully metal model</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Trapezoidal block</li> <li>• Sleek metal design</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Simple controls</li> <li>• Need Bluetooth device</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Unpack and use</li> <li>• Need plug or battery pack</li> <li>• Need Bluetooth device</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 1079.02</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4.8/5.0</li> </ul>
<b>Website</b>	<a href="http://www.bose.com/controller?url=/shop_online/digital_music_systems/bluetooth_speakers/soundlink_mini/index.jsp">http://www.bose.com/controller?url=/shop_online/digital_music_systems/bluetooth_speakers/soundlink_mini/index.jsp</a>
<b>FlexCat</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Battery life: 10+ hours</li> <li>• Wireless range: 200ft</li> <li>• Comes with group speakers, remote, charging station, and classroom speaker</li> <li>• Can connect multimedia audio</li> <li>• Provides two-way communication for small group instruction</li> <li>• Teachers can listen in and communicate with each group through a central monitoring speaker</li> <li>• Teachers have a remote where they can select to talk to individual groups or the whole class</li> <li>• Integrated microphone</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> <li>• Allow for small group use</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 3 year warranty</li> <li>• 5 year warranty on microphones</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Dimensions: 8.5in x 5in x 3.5in</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Requires charging</li> <li>• Wireless</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Portable</li> <li>• No installation</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 14988 Danish Krone</li> </ul>

<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.lightspeed-tek.com/products/flexcat/">http://www.lightspeed-tek.com/products/flexcat/</a>
<b>FrontRow Pro Digital with Ceiling Speakers</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Monitors sound quality</li> <li>• Suppresses Feedback</li> <li>• Optimizes power use</li> <li>• Comes with a receiver, microphone, and four ceiling speaker units</li> <li>• Two-channel infrared reception</li> <li>• Two stereo aux inputs</li> <li>• One mono aux output</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Need to use microphone</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 5 year Warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Four Speakers installed in ceiling</li> <li>• White and Round</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Teachers turn on the mic and the receiver automatically wakes up from its energy-saving sleep mode and goes back to sleep when the mic is turned off</li> <li>• Wireless</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Requires Installation</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 7149 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://ecom.dataimpressions.com/audioVisual_front_row.html">http://ecom.dataimpressions.com/audioVisual_front_row.html</a>
<b>FrontRow TOGO</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• The precision-mounted two-speaker line array reinforces and spreads more sound energy throughout the listening zone, making it able to cover an entire classroom</li> <li>• Auxiliary audio input for TV, computer, and mp3 players</li> <li>• Auxiliary output</li> <li>• Provides up to 6.5 hours of completely wireless operating time</li> <li>• High-quality directional loudspeakers provide full, clear sound</li> <li>• Consists of a separate volume control for each channel, and adjustable tone control and a volume control for the auxiliary input port</li> <li>• Phase angled so sound cancellation occurs at the top and bottom of the speaker enclosure which reduces reverberation</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Requires microphone that can be worn</li> <li>• Portable</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 5 year warranty</li> </ul>

<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Speaker: 7.2in x 3.4in x 29.5in</li> <li>• One speaker</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Requires charging</li> <li>• Wireless</li> <li>• Can take a put anywhere</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• No installation</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 828 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://gofrontrow.com/en/products/frontrow-to-go">http://gofrontrow.com/en/products/frontrow-to-go</a>
<b>HISONIC HS120B Portable PA</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• A portable PA system with multiple accessories</li> <li>• Includes a hand microphone, a lapel system, and a headset, and an amplifier</li> <li>• 17.78 x 29.85 cm x 11 cm</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Multiple ways of using it</li> <li>• Meant for portability</li> <li>• Only one microphone can be used at a time</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Very solid customer service if anything goes wrong</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Black box contrasts with whiteboard walls</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Plug in and use</li> <li>• Customizable with plenty of knobs</li> <li>• Can change frequencies to prevent interference</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Plug in and use</li> <li>• Battery that needs charging if you want it to be mobile</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 1025.07 dkk</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4.3/5.0</li> </ul>
<b>Website</b>	<a href="http://www.hisonic.net/SH120B.htm">http://www.hisonic.net/SH120B.htm</a>
<b>iHome iHM60GY Portable Speaker</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Small, portable sound system</li> <li>• Expandable to create louder sound</li> <li>• Auxiliary cable plug-in</li> <li>• 12.7 cm x 5.08 cm x 5.08 cm</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Easy to move due to small size</li> <li>• Any device with an Auxiliary cable</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Durable</li> <li>• Good customer service</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Small</li> <li>• White</li> <li>• Expandable</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Plug in an auxiliary cord and turn on</li> <li>• Very simple</li> </ul>

<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Plug and play</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 107.90 dkk</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4.4/5.0</li> </ul>
<b>Website</b>	<a href="http://ihomeaudiointl.com/iHM60GY/">http://ihomeaudiointl.com/iHM60GY/</a>
<b>Kinivo ZX100 Portable Rechargeable Resonator</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Small, portable sound system</li> <li>• Expandable to create louder sound</li> <li>• Auxiliary cable plug-in</li> <li>• 9.40 cm x 11.94 cm x 5.08 cm</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Easy to move due to small size</li> <li>• Any device with an Auxiliary cable</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Durable</li> <li>• Good customer service</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Small</li> <li>• Red and Black</li> <li>• Expandable</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Plug in an auxiliary cord and turn on</li> <li>• Very simple</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Plug and play</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 161.85 dkk</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4.4/5.0</li> </ul>
<b>Website</b>	<a href="http://www.kinivo.com/Kinivo-ZX100-Portable-Rechargeable-Resonator/dp/B004HHICKC">http://www.kinivo.com/Kinivo-ZX100-Portable-Rechargeable-Resonator/dp/B004HHICKC</a>
<b>Nutone Intercom System</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Intercom System meant for multiple rooms</li> <li>• Can play music</li> <li>• Push-to-talk</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Can install variable number of speakers</li> <li>• Once installed, hard to remove system.</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Can last for a long time (10+ years)</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• White Plastic designs</li> <li>• Blend in partially with the wall</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Push to talk</li> <li>• Plug in iPod</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Needs a lot of wiring</li> <li>• Physically installed early on</li> <li>• Self-install, unless hire others</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 2913.35 dkk for master station</li> <li>• 285.94 dkk for individual speakers</li> <li>• 4057.11 dkk for Master + 4 speakers</li> </ul>



<b>User Reviews</b>	<ul style="list-style-type: none"> <li>No reviews</li> <li>Many forum posts, all mixed. “Good reliable system, everything else is not very good.”</li> </ul>
<b>Website</b>	<a href="http://www.nutone.com/products/series/master-station-100d0bc1-17cc-4b94-b486-e587b45b964f">http://www.nutone.com/products/series/master-station-100d0bc1-17cc-4b94-b486-e587b45b964f</a>
<b>PD-IT Pro Digital IR System</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>Monitors sound quality</li> <li>Suppresses Feedback</li> <li>Optimizes power use</li> <li>Comes with a receiver, microphone, and two IR speaker units</li> <li>Two-channel infrared reception</li> <li>Two stereo aux inputs</li> <li>One mono aux output</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>Need to use microphone</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>5 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>Two speakers combined in two IR speaker clusters</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>Teachers turn on the mic and the receiver automatically wakes up from its energy-saving sleep mode and goes back to sleep when the mic is turned off</li> <li>Wireless</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>Combines two speakers with an infrared sensor so installations take half the time of four speaker systems</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>7095 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Website</b>	<a href="http://gofrontrow.com/en/products/frontrow-pro-digital">http://gofrontrow.com/en/products/frontrow-pro-digital</a>

<b>RedCat Access</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>Exciter technology for even sound distribution</li> <li>Wireless integration capabilities</li> <li>Connect and direct multimedia audio</li> <li>Batteries will support a full day in the classroom</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>Portable</li> <li>Battery Operated</li> <li>Requires pendant-style microphone</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>5 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>Speaker: 16” x 9” x 1.75”</li> <li>2.9lbs, 1.3kg</li> <li>Flat-panel speaker</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>Requires charging</li> <li>Wireless</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>No installation</li> </ul>

<b>Price</b>	<ul style="list-style-type: none"> <li>• 4046 Danish Kroner</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.lightspeed-tek.com/products/redcat-family/redcat-access/">http://www.lightspeed-tek.com/products/redcat-family/redcat-access/</a>
<b>SMART Audio</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Evenly distributes sound throughout the classroom</li> <li>• SMART Audio includes a wireless infrared microphone, four wall or ceiling mounted speakers, a room module that combines an amplifier and infrared sensor, and a control unit that provides a USB connection to a computer</li> <li>• Can connect to portable mp3 players, DVD players, and computers</li> <li>• Integrates with SMART Notebook software and the SMART Board interactive whiteboard</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Can choose wall mounted or ceiling mounted</li> <li>• 4 Speakers</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Ceiling speakers: 9.5in x 6in</li> <li>• Wall speakers: 5.5in x 7.75in x 5.25in</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Wireless</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• No installation</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 10790 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.chariotgroup.com/smart/pdf_smart/audio_fact_sheet_education.pdf">http://www.chariotgroup.com/smart/pdf_smart/audio_fact_sheet_education.pdf</a>
<b>TopCat</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Wireless connectivity for media sources from the teacher's desk</li> <li>• Comes with TopCat Amplifier, integrated Sensor Receiver, Media Connector, Remike VC Infrared Microphone, Redmike Cradle Charger</li> <li>• Cross-over technology for even sound distribution</li> <li>• Batteries will support a full day in the classroom</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Requires microphone</li> <li>• Requires charging</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 5 Year warranty, 1 year warranty on batteries</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• One Speaker</li> <li>• Large, and installed in ceiling</li> <li>• Speaker: 24in x 24in x 3in</li> <li>• 22lbs</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Requires charging once a day</li> <li>• Wireless</li> </ul>

<b>Ease of Implementation</b>	<ul style="list-style-type: none"><li>• Overhead installation of one speaker</li></ul>
<b>Price</b>	<ul style="list-style-type: none"><li>• 9765 Danish Krone</li></ul>
<b>User Reviews</b>	<ul style="list-style-type: none"><li>• N/A</li></ul>
<b>Website</b>	<a href="http://www.lightspeed-tek.com/products/topcat/">http://www.lightspeed-tek.com/products/topcat/</a>

## N.4 Communication

<b>NearPod</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Mobile and Tablet app for screen-sharing</li> <li>• Professor can lecture share</li> <li>• Professor can poll students</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Available on all common Operating Systems</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• No negative user reviews about reliability, no other data</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Nice-looking app</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Relatively easy, professor distributes “Class Code” to students who sign in</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Easy, just install the app</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• Free</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 3.5/5</li> </ul>
<b>Website</b>	<a href="http://www.nearpod.com">www.nearpod.com</a>

## N.5 Data Collection

<b>Google Documents</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• File saving and sharing website</li> <li>• Users can collaborate live</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Works on browser and therefore any machine</li> <li>• Has mobile and tablet apps</li> <li>• Can host many types of files</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Long time user with no problems. Any issues are fixed almost immediately (it's google)</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Good</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Very intuitive, good documentation</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• None needed besides creating google account</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• Free</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="https://drive.google.com">https://drive.google.com</a>
<b>i&gt;Clicker</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Hardware and Software for classroom student polling</li> <li>• Most popular found system</li> <li>• Students can use a mobile app instead of a clicker</li> <li>• Integrates with PowerPoint and other presentation tools</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Support for OS X and Windows</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Professional company with service provided</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Good</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Difficult to determine, claims to have easy to use software for professors. Was straightforward for students</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Few details given... requires purchasing a lot of clickers</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 205 DKK / Student</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4</li> </ul>
<b>Website</b>	<a href="http://www1.iclicker.com/">http://www1.iclicker.com/</a>
<b>SurveyGizmo</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Website for polling / surveying</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Works on browser and therefore any machine</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Professional company with service provided</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Good</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Good looking, professional documentation</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Email account required for sign-up</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• Free (effectively)</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4.5</li> </ul>

Website	<a href="http://www.surveygizmo.com/">http://www.surveygizmo.com/</a>
<b>SurveyMonkey</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Website for polling / surveying</li> <li>• Almost ubiquitous</li> <li>• Social media integration</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Works on browser and therefore any machine</li> <li>• Support for multiple languages, including Danish</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Professional company with service provided</li> <li>• Very popular, lots of online examples</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Good</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Good looking, professional documentation</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Email account required for sign-up</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• Free (effectively)</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4</li> </ul>
Website	<a href="https://da.surveymonkey.com/">https://da.surveymonkey.com/</a>
<b>Turning Technologies</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Hardware and Software for classroom student polling</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Support for OS X and Windows</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Professional company with service provided</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Good</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Difficult to determine, claims to have easy to use software for professors. Was straightforward for students</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Few details given... requires purchasing a lot of clickers</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• None found</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4</li> </ul>
Website	<a href="http://www.qualtrics.com/">http://www.qualtrics.com/</a>
<b>Qualtrics</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Website for polling / surveying</li> <li>• Probably the most complete polling software</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Works on browser and therefore any machine</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Professional company with service provided</li> <li>• Very popular, lots of online examples</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Good</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Good looking, professional documentation</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Email account required for sign-up</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• None listed</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• None</li> </ul>
Website	<a href="http://www.qualtrics.com/">http://www.qualtrics.com/</a>

## N.6 Data Sharing

<b>Dropbox</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• File saving and sharing</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Works on browser and therefore any machine</li> <li>• Has mobile and tablet apps</li> <li>• Can host many types of files</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Long time user with no problems. Backed by large private company with frequent updates and bug-fixes</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Good</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Very intuitive, good documentation</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Email account required</li> <li>• Can download app (easy)</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• Free</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4-4.5</li> </ul>
<b>Website</b>	<a href="https://www.dropbox.com/">https://www.dropbox.com/</a>
<b>Google Documents</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• File saving and sharing website</li> <li>• Users can collaborate live</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Works on browser and therefore any machine</li> <li>• Has mobile and tablet apps</li> <li>• Can host many types of files</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Long time user with no problems. Any issues are fixed almost immediately (it's google)</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Good</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Very intuitive, good documentation</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• None needed besides creating google account</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• Free</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="https://drive.google.com">https://drive.google.com</a>

## N.7 Interactive Interfaces

<b>CAVE System</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• A series of walls and projectors that give the user the feeling of being inside the virtual space</li> <li>• It puts one's self 'into' the data for analysis</li> <li>• It tracks the user's motion so he or she can interact with the virtual space</li> <li>• Calibrates to a focal point (the user's head) to be sure the space's perspectives are correctly oriented</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Can create a unique setup to suit the needs of the customer</li> <li>• It is used for a variety of purposes</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Requires extremely high-end computer hardware to support it</li> <li>• Intensive software and a plethora of hardware has many opportunities to fail</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• It looks nice when it's in use</li> <li>• It can be incredibly invasive when it's not in use</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Requires calibration and training to use</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Requires huge implementation process</li> <li>• Long time to implement</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• Nearly 5.395.100 dkk for a low-end version</li> <li>• Varies dramatically depending upon the setup</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 5 out of 5</li> </ul>
<b>Website</b>	<a href="http://www.mechdyne.com/cave.aspx">http://www.mechdyne.com/cave.aspx</a>
<b>eBeam Edge</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Magnetic receiver is placed on a white board, and it can be moved</li> <li>• 'Capture pack' comes with 4 dry-erase marker sleeves, and the device captures material drawn with real markers and erased with the eraser</li> <li>• When combined with a projector, it can become an interactive screen</li> <li>• It's 1cm x 4cm x 20cm and weighs only 28 grams</li> <li>• Includes a stylus to use as a mouse, or otherwise interact with projected content</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Works for Mac and PC</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Has an active tech support</li> </ul>



<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Small and non-intrusive</li> <li>• Sleek design</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Have to install a drive for one's computer to work with it</li> <li>• A user claimed that the annotation software that comes with it is relatively difficult to understand, but the user learned it after about 15 minutes</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Easily mounted using its magnet</li> <li>• Can also be mounted using a bracket if the board is not magnetic</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 3884 dkk</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4 out of 5</li> </ul>
<b>Website</b>	<a href="http://www.e-beam.com/education/ebeam-edge/overview.html">http://www.e-beam.com/education/ebeam-edge/overview.html</a>
<b>eBeam Engage</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Magnetic receiver is placed on a white board, and it can be moved</li> <li>• 'Capture pack' comes with 4 dry-erase marker sleeves, and the device captures material drawn with real markers and erased with the eraser</li> <li>• When combined with a projector, it can become an interactive screen</li> <li>• It's 80cm x 6cm and weighs about 60 grams</li> <li>• Includes a stylus to use as a mouse, or otherwise interact with projected content</li> <li>• Includes remote with mini keyboard, touchpad, and page scroll</li> <li>• Includes various applications (web browser, presentation, movies, etc.)</li> <li>• Scroll knob on the device to navigate presentations or web sites</li> <li>• Built-in speaker with auxiliary line in/out ports</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• An array of features and software that increase its flexibility</li> <li>• Works with both Mac and PC</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Has an active tech support</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Not very intrusive</li> <li>• Sleek design</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Have to install a drive for one's computer to work with it</li> <li>• A user claimed that the annotation software that comes with it is relatively difficult to understand, but the user learned it after about 15 minutes</li> <li>• With more features, it can become more difficult to learn</li> <li>• Comes with a guide on how to use it</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Easily mounted using its magnet</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 5390 dkk</li> </ul>

<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4.5 out of 5</li> </ul>
<b>Website</b>	<a href="http://www.e-beam.com/education/ebeam-engage/overview.html">http://www.e-beam.com/education/ebeam-engage/overview.html</a>
<b>Emotiv Headsets</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• A headset that fits on the users head</li> <li>• It measures brain waves and converts certain wave patterns into computer commands</li> <li>• Includes software with free applications</li> <li>•</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• For PC and Mac</li> <li>• These computer commands can be used for any computing tasks (presentations, data analysis, web browsing, games, etc.)</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Reviewer claims that when it works, it's incredible. When it doesn't, it's frustrating and difficult to get right</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Has a nice design</li> <li>• Looks strange on the user's head</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Have to train it (an "orange box" is a training application that asks the user to choose a thought for each direction to move/rotate the box)</li> <li>• Takes about 5 or 10 minutes to set up each time it is used (all 16 sensors need to be dampened individually and put them on the headset, then repeat when the user takes the headset off)</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• The user simply needs to install the software to use the device</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 1613 dkk for low end model</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 3 out of 5</li> </ul>
<b>Website</b>	<a href="http://emotiv.com/">http://emotiv.com/</a>
<b>iPad Retina</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• A touchscreen tablet</li> <li>• Overall size: 18.5cm x 24cm x .9cm</li> <li>• Has access to the Apple AppStore, where millions of apps are in reach by the user</li> <li>• iOS software</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• The millions of apps facilitate a variety of activities (drawing, video editing, music creation, etc.)</li> <li>• Can also be connected to a TV with a cable that is not included, then the screen can be displayed for presentations</li> <li>• Has Apple-specific ports, besides the audio port</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Apple has great customer service</li> <li>• Many stores are available to fix or answer questions</li> <li>• The software is robust (very few intrusive bugs have ever existed)</li> </ul>

<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Sleek design</li> <li>• Recognizable</li> <li>• Fitting for a studio</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Software is intuitive</li> <li>• Many students and professors are familiar with Apple's iOS, so it will be easy to pick up</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Virtually none necessary</li> <li>• If the facilitator wants certain apps to be on them, they only have to download the apps on each iPad</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 2153 dkk</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4.5 out of 5</li> </ul>
<b>Website</b>	<a href="http://store.apple.com/us/buy-ipad/ipad-retina">http://store.apple.com/us/buy-ipad/ipad-retina</a>
<b>Samsung Galaxy Note 10.1</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• A touchscreen tablet</li> <li>• Has access to the Google Play store, where millions of apps are in reach by the user</li> <li>• Android Software</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• The millions of apps facilitate a variety of activities (drawing, video edition, music creation, etc.)</li> <li>• Can also be connected to a TV with a cable that is not included, then the screen can be displayed for presentations</li> <li>• Has common ports (cheaper parts and possibly easier to find)</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Customer service available</li> <li>• The software tends to be slower than users would like</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Very nice device design, would fit in with the Studio well</li> <li>• The software is aesthetically pleasing</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• The software is not commonly used, so there will be a learning curve to use it</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Virtually none necessary</li> <li>• If the facilitator wants certain apps to be on them, they only have to download the apps on each Note</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 2692 dkk</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4.5 out of 5</li> </ul>
<b>Website</b>	<a href="http://www.samsung.com/global/microsite/2014galaxynote10.1/">http://www.samsung.com/global/microsite/2014galaxynote10.1/</a>
<b>SmartBoard 480iv</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Interactive board that is combined with projected video to create an interactive display</li> <li>• Connects to computers via USB</li> <li>• Can read or manipulate info easily, and it makes the process hands-on and dynamic (the user can move letters, numbers, words, and figures with his or her fingers)</li> <li>• Comes with SMART software (notebook, response systems, 3D tools, etc.)</li> </ul>

<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Software options facilitate a variety of activities</li> <li>• Faculty and students alike could benefit from this</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Offer great customer service to their consumers</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• It fits in well with the studio environment</li> <li>• When it's not being used, it may be invasive</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Claimed to have very intuitive software</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Claimed to be easy to install and manage</li> <li>• Workers implement the complete system for the customer</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• (estimated) 5929 dkk</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 3 out of 5</li> </ul>
<b>Website</b>	<a href="http://smarttech.com/gb/Solutions/Education+Solutions/Products+for+education/Interactive+whiteboards+and+displays/SMART+Board+interactive+whiteboards/480iv+for+education">http://smarttech.com/gb/Solutions/Education+Solutions/Products+for+education/Interactive+whiteboards+and+displays/SMART+Board+interactive+whiteboards/480iv+for+education</a>

### **Wacom DTU-1031**

<b>General Description</b>	<ul style="list-style-type: none"> <li>• A tablet designed for businesses and artists alike</li> <li>• Used for annotating, marking up, or sharing presentations and handwriting</li> <li>• Software partners provide applications for the device</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• A variety of applications for various uses</li> <li>• Pen finds biometric info, such as the pressure experienced</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• No information on reliability</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Fits in a studio (it is a common tool in art studios)</li> <li>• Design of the device looks slightly out of date</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Claimed easy to use</li> <li>• Touch screen is intuitive (it is not difficult to draw on it)</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• By itself, it requires no implementation</li> <li>• If used on a podium, needs a mount and cable hookup</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 4041 dkk</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4 out of 5</li> </ul>
<b>Website</b>	<a href="https://store.wacom.com/us/en/product/DTU1031/">https://store.wacom.com/us/en/product/DTU1031/</a>

### **Wacom DTU-1631**

<b>General Description</b>	<ul style="list-style-type: none"> <li>• A tablet designed for businesses and artists alike</li> <li>• Used for annotating, marking up, or sharing presentations and handwriting</li> <li>• Software partners provide applications for the device</li> <li>• More high-end hardware</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• A variety of applications for various uses</li> <li>• Pen finds biometric info, such as the pressure experienced</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• No information on reliability</li> </ul>

<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Fits in a studio (it is a common tool in art studios)</li> <li>• Design of the device looks sleek and fitting for the studio</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Claimed easy to use</li> <li>• Touch screen is intuitive (it is not difficult to draw on it)</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• By itself, it requires no implementation</li> <li>• If used on a podium, needs a mount and cable hookup</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 6738 dkk</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4 out of 5</li> </ul>
<b>Website</b>	<a href="https://store.wacom.com/us/product/?product=DTU1631">https://store.wacom.com/us/product/?product=DTU1631</a>

## N.8 Media Manipulation

<b>Audacity</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Photo editor</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Perform all photo editing tasks</li> <li>• Cross Platform (OS X, Windows)</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Backed by large company with good support</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Complex program, lots of varied tasks. Does have good documentation.</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Easy, just install the program</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• Free</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4-4.5</li> </ul>
<b>Website</b>	<a href="http://www.adobe.com/products/photoshop-elements.html">http://www.adobe.com/products/photoshop-elements.html</a>
<b>Audacity</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Sound track editor to create tunes, songs, etc.</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Perform all sound editing tasks</li> <li>• Cross Platform (OS X, Windows)</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Large open source project with good documentation and frequent releases</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Complex program, lots of varied tasks. Does have good documentation.</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Easy, just install the program</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• Free</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 3.5-4</li> </ul>
<b>Website</b>	<a href="http://audacity.sourceforge.net/">http://audacity.sourceforge.net/</a>
<b>Gimp</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Photo editor similar to PhotoShop</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Powerful photo editor</li> <li>• Cross Platform (OS X, Windows)</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Popular open-source project with updates</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Complex program, lots of varied tasks. Does have good documentation however.</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Easy, just install the program</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• Free</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4</li> </ul>
<b>Website</b>	<a href="http://www.gimp.org">www.gimp.org</a>

## N.9 Presentation Displays

<b>AcerX1240</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 2700 lumens brightness</li> <li>• Manual zoom</li> <li>• Manual lens focus</li> <li>• Video and computer inputs</li> <li>• No digital input</li> <li>• 1024x768</li> <li>• USB port</li> <li>• Comes with soft carrying case</li> <li>• PC 3D ready</li> <li>• 500 hours of lame life</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 3 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 8cm x 26cm x 22cm</li> <li>• 2kg</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 2056 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.projectorcentral.com/Acer-X1240.htm">http://www.projectorcentral.com/Acer-X1240.htm</a>
<b>BenQ MS517</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 2800 Lumens</li> <li>• 13000:1 Contrast</li> <li>• Manual Focus</li> <li>• Manual Zoom</li> <li>• 76-762cm image size</li> <li>• PC 3D Ready</li> <li>• HDMI input</li> <li>• Video Input</li> <li>• 800x600 Pixels</li> <li>• 4500 hours of lamp life</li> <li>• RS232 Port</li> <li>• PC 3D Ready</li> <li>• Crestron</li> <li>• RoomView</li> <li>• USB Port</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 1 year warranty</li> </ul>

<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 2.3kg</li> <li>• 11cm x 30cm x 22cm</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 1775 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 5 stars, 2 ratings</li> </ul>
<b>Website</b>	<a href="http://www.benq.com/product/projector/ms517st/">http://www.benq.com/product/projector/ms517st/</a>
<b>BenQ MS502</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 2700 Lumens</li> <li>• 13000:1 Contrast</li> <li>• Manual Focus</li> <li>• Manual Zoom</li> <li>• 76-762cm image size</li> <li>• PC 3D Ready</li> <li>• Video Input</li> <li>• 800x600 Pixels</li> <li>• 4500 hours of lamp life</li> <li>• RS232 Port</li> <li>• USB Port</li> <li>• PC 3D Ready</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 1 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 2.4kg</li> <li>• 11cm x 29cm x 23cm</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 1214 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 5 stars, 1 user review</li> </ul>
<b>Website</b>	<a href="http://www.projectorcentral.com/BenQ-MS502.htm">http://www.projectorcentral.com/BenQ-MS502.htm</a>



<b>BenQ MS502</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 2700 Lumens</li> <li>• 13000:1 Contrast</li> <li>• Manual Focus</li> <li>• Manual Zoom</li> <li>• 76-762cm image size</li> <li>• PC 3D Ready</li> <li>• Video Input</li> <li>• 800x600 Pixels</li> <li>• 4500 hours of lamp life</li> <li>• RS232 Port</li> <li>• USB Port</li> <li>• PC 3D Ready</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 1 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 2.4kg</li> <li>• 11cm x 29cm x 23cm</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 1214 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 5 stars, 1 user review</li> </ul>
<b>Website</b>	<a href="http://www.projectorcentral.com/BenQ-MS502.htm">http://www.projectorcentral.com/BenQ-MS502.htm</a>
<b>BenQ MS504</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 3000 Lumens</li> <li>• 13000:1 Contrast</li> <li>• Manual Focus</li> <li>• Manual Zoom</li> <li>• 106-762cm image size</li> <li>• PC 3D Ready</li> <li>• Video Input</li> <li>• 800x600 Pixels</li> <li>• 4500 hours of lamp life</li> <li>• RS232 Port</li> <li>• USB Port</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 1 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 1.8kg</li> <li>• 9cm x 28cm x 22cm</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>

<b>Price</b>	<ul style="list-style-type: none"> <li>• 1619 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.projectorcentral.com/BenQ-MS504.htm">http:// www.projectorcentral.com/BenQ-MS504.htm</a>
<b>BenQ MS616ST</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 2500 Lumens</li> <li>• 13000:1 Contrast</li> <li>• Manual Focus</li> <li>• Manual Zoom</li> <li>• 106-762cm image size</li> <li>• PC 3D ReadyThrow</li> <li>• HDMI input</li> <li>• Video Input</li> <li>• 800x600 Pixels</li> <li>• 4500 hours of lamp life</li> <li>• Short</li> <li>• USB Port</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 1 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 2.7kg</li> <li>• 10cm x 31cm x 24cm</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 2530 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.projectorcentral.com/BenQ-MS616ST.htm">http://www.projectorcentral.com/BenQ-MS616ST.htm</a>
<b>BenQ MX520</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 3000 Lumens</li> <li>• 13000:1 Contrast</li> <li>• Manual Focus</li> <li>• Manual Zoom</li> <li>• 76-762cm image size</li> <li>• PC 3D Ready</li> <li>• HDMI input</li> <li>• Video Input</li> <li>• 1024x768 Pixels</li> <li>• 4000 hours of lamp life</li> <li>• RS232 Port</li> <li>• USB Port</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 3 year warranty</li> </ul>

<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 2.4kg</li> <li>• 11cm x 29cm x 23cm</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 2255 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.projectorcentral.com/BenQ-MX520.htm">http://www.projectorcentral.com/BenQ-MX520.htm</a>
<b>BenQ MW519</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 2800 Lumens</li> <li>• 13000:1 Contrast</li> <li>• Manual Focus</li> <li>• Manual Zoom</li> <li>• 77-760cm image size</li> <li>• PC 3D Ready</li> <li>• HDMI input</li> <li>• Video Input</li> <li>• 1280x800 Pixels</li> <li>• Crestron</li> <li>• RoomView</li> <li>• RS232 Port</li> <li>• USB Port</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 1 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 2.3kg</li> <li>• 11cm x 30cm x 22cm</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 2805 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.projectorcentral.com/BenQ-MW519.htm">http://www.projectorcentral.com/BenQ-MW519.htm</a>
<b>BenQ MW523</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 3000 lumens brightness</li> <li>• 1280x800</li> <li>• 1300:1 Contrast</li> <li>• Manual Zoom</li> <li>• Manual Focus</li> <li>• 8—772cm image size</li> <li>• HTMI Digital input</li> <li>• Video inputs</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> </ul>

<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 1 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 11cm x 30cm x 22cm</li> <li>• 2.3kg</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 2681 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.projectorcentral.com/BenQ-MW523.htm">http://www.projectorcentral.com/BenQ-MW523.htm</a>
<b>BenQ MX520</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 3000 Lumens</li> <li>• 13000:1 Contrast</li> <li>• Manual Focus</li> <li>• Manual Zoom</li> <li>• 76-762cm image size</li> <li>• PC 3D Ready</li> <li>• HDMI input</li> <li>• Video Input</li> <li>• 1024x768 Pixels</li> <li>• 4000 hours of lamp life</li> <li>• RS232 Port</li> <li>• USB Port</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 3 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 2.4kg</li> <li>• 11cm x 29cm x 23cm</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 2255 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.projectorcentral.com/BenQ-MX520.htm">http://www.projectorcentral.com/BenQ-MX520.htm</a>

<b>BenQ MX620ST</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• World-Leading SmartEco Technology</li> <li>• LampSave Mode</li> <li>• Blue-ray Full HD 3D Supported</li> <li>• Short-Throw Projection</li> <li>• 1300:1 contrast ration</li> <li>• 30in-300in image size (diagonal)</li> <li>• 1.2x zoom</li> <li>• Comes with lens cover, remote control, power cord</li> <li>• HDMI port</li> <li>• USB port</li> <li>• Video compatible</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> <li>• Wireless Display</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 1 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 287.3mm x 114.4mm x 232.6mm</li> <li>• 2.6kg</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 2756 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.benq.com/product/projector/mx620st/">http://www.benq.com/product/projector/mx620st/</a>
<b>BrightLink 436Wi</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 3000 lumens brightness</li> <li>• 1280x800</li> <li>• 3000:1 Contrast</li> <li>• No Zoom</li> <li>• Manual Focus</li> <li>• 173—287cm image size</li> <li>• HTMI Digital input</li> <li>• Video inputs</li> <li>• Interactive</li> <li>• Short-Throw</li> <li>• RS232 Port</li> <li>• USB Port</li> <li>• Blackboard Mode</li> <li>• Crestron RoomView</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Wired Networking</li> <li>• Wireless Networking</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 2 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 16cm x 35cm x 30cm</li> </ul>

<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 7985 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.projectorcentral.com/Epson-BrightLink_436Wi.htm">http://www.projectorcentral.com/Epson-BrightLink_436Wi.htm</a>
<b>BrightLink 475Wi Interactive WXGA 3LCD Projector</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 2600 Lumens</li> <li>• 1280x800</li> <li>• 3000:1 Contrast</li> <li>• Manual focus</li> <li>• 1.35x zoom</li> <li>• HDMI port</li> <li>• Computer and video port</li> <li>• USB port</li> <li>• Wireless port</li> <li>• 3LCD, 3-chip technology</li> <li>• Short-throw projection</li> <li>• HDMI connectivity</li> <li>• Comes with projector, wall mount, power cable, USB cable, interactive driver for mac, Epson Easy Interactive tools, network management software, projector remote control, batteries, and two interactive pens</li> <li>• Energy-efficient 3LCD light engine</li> <li>• Recyclable product</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Compatible with Mac</li> <li>• Infrared technology</li> <li>• USB cable required for interactivity</li> <li>• Comes with two digital pens</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 2 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 13.5 lbs</li> <li>• 14.5in x 14.8in x 5.7in</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Comes with multiple user guides</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Install manually</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 10785 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.epson.com/cgi-bin/Store/jsp/Product.do?sku=V11H453520W">http://www.epson.com/cgi-bin/Store/jsp/Product.do?sku=V11H453520W</a>

<b>BrightLink 485Wi Interactive WXGA 3LCD Projector with Mount</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 3100 Lumens</li> <li>• 1280x800</li> <li>• 3000:1 Contrast</li> <li>• Manual focus</li> <li>• 1.35x zoom</li> <li>• HDMI port</li> <li>• Computer and video port</li> <li>• USB port</li> <li>• Wireless port</li> <li>• Short-throw projection</li> <li>• HDMI connectivity</li> <li>• Energy-efficient 3LCD light engine</li> <li>• Recyclable product</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Compatible with Mac</li> <li>• Infrared technology</li> <li>• Built in interactivity with PC-free annotation</li> <li>• Wirelessly project from iPhone, iPad, and Android mobile devices</li> <li>• Comes with two digital pens</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 3 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 13.5lbs</li> <li>• 14.5in x 14.8in x 5.7in</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Comes with multiple user guides</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Install manually</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 11864 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.epson.com/cgi-bin/Store/jsp/Product.do?sku=V11H452520W">http://www.epson.com/cgi-bin/Store/jsp/Product.do?sku=V11H452520W</a>

<b>BrightLink 585Wi Interactive WXGA 3LCD Projector</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 3300 Lumens</li> <li>• 1280x800</li> <li>• 10000:1 Contrast</li> <li>• Manual focus</li> <li>• 1.35x zoom</li> <li>• HDMI port</li> <li>• USB port</li> <li>• Wireless port</li> <li>• 3LCD, 3-chip technology</li> <li>• Short-throw projection</li> <li>• HDMI connectivity</li> <li>• Comes with projector, wall mount, power cable, USB cable, Epson Easy Interactive Tools, Network Management software, projector remote control, batteries, and two interactive pens</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Share and compare students work from multiple devices simultaneously with network Moderator software</li> <li>• Allows two students to annotate simultaneously anywhere on the surface on which the image is projected</li> <li>• Compatible with Mac</li> <li>• Infrared technology</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 2 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 14.5in x 14.8in x 6.1in</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Comes with multiple user guides</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Install manually</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 11864 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.epson.com/cgi-bin/Store/jsp/Product.do?sku=V11H600022">http://www.epson.com/cgi-bin/Store/jsp/Product.do?sku=V11H600022</a>



<b>BrightLink 595Wi Interactive WXGA 3LCD Projector</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 3300 Lumens</li> <li>• 1280x800</li> <li>• 3000:1 Contrast</li> <li>• Manual focus</li> <li>• 1.35x zoom</li> <li>• HDMIx2 port</li> <li>• Computer and video port</li> <li>• USB port</li> <li>• Wireless port</li> <li>• 3LCD, 3-chip technology</li> <li>• Short-throw projection</li> <li>• Comes with projector, finger touch module, wall mount, power cable, USB cable, finger touch cable, VGA cable, interactive driver for Mac, Epson Easy interactive tools, Network Management software, remote control, batteries, IR deflector, and two interactive pens</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Compatible with Mac</li> <li>• Infrared technology</li> <li>• Enables as many as six students to touch, draw, select and interact using intuitive and familiar gestures</li> <li>• Comes with two digital pens</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 2 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 12.1lbs</li> <li>• 14.5in x 14.8in x 6.1in</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Comes with multiple user guides</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Install manually</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 12943 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.epson.com/cgi-bin/Store/jsp/Product.do?sku=V11H599022">http://www.epson.com/cgi-bin/Store/jsp/Product.do?sku=V11H599022</a>
<b>Dell1210S</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 2500 Lumens</li> <li>• 2200:1 Contrast</li> <li>• Manual Focus</li> <li>• Manual Zoom</li> <li>• 22.9-303in image size</li> <li>• Video Input</li> <li>• 800x600 Pixels</li> <li>• USB Port</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 2 year warranty</li> </ul>

<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 5.3lbs</li> <li>• 30.5cm x 11.3cm x 7.6cm</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 1840 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 5 stars, 2 reviews</li> </ul>
<b>Website</b>	<a href="http://www.projectorcentral.com/Dell-1210HD.htm">http://www.projectorcentral.com/Dell-1210HD.htm</a>
<b>Dell 1610HD</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 3500 Lumens</li> <li>• 2100:1 Contrast</li> <li>• Manual Focus</li> <li>• Manual Zoom</li> <li>• 36.3-362in image size</li> <li>• HDMI input</li> <li>• Video Input</li> <li>• 1280x800 Pixels</li> <li>• PC 3D Ready</li> <li>• 3000 hour lamp life</li> <li>• RS232 Port</li> <li>• USB Port</li> <li>• Closed Captioning</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> <li>• Comes with Soft carrying case</li> <li>• Wired Networking</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 2 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 5.2lbs</li> <li>• 3.5cm x 11.7cm x 8cm</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 4861 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4.5, 3 user reviews</li> </ul>
<b>Website</b>	<a href="http://www.projectorcentral.com/Dell-1610HD.htm">http://www.projectorcentral.com/Dell-1610HD.htm</a>

<b>Dell S500WI</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 3200 Lumens</li> <li>• 1280x800</li> <li>• 2300:1 Contrast</li> <li>• 1.35x zoom</li> <li>• HDMI port</li> <li>• Computer and video port</li> <li>• USB port</li> <li>• Wireless port</li> <li>• 3LCS, 3-chip technology</li> <li>• Short-throw projection</li> <li>• Comes with projector, interactive pen, remote control, batteries, power cord, VGA cable, USB cable</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Compatible with Mac</li> <li>• Up to 30 users at once</li> <li>• Simultaneous projection from up to 4 different sources</li> <li>• Comes with two digital pens</li> <li>• Supports wireless audio</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Can purchase 3 year warranty and 5 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 15.6lbs</li> <li>• 12.9in x 7.5in x 16.6in</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Comes with user guides</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Self-installation manually</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 7283 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4 stars, 1 review</li> </ul>
<b>Website</b>	<a href="http://partnerdirect.dell.com/sites/channel/Documents/Dell_S500wi_Interactive_Ultra_Short_Throw_Projector_Brochure.pdf">http://partnerdirect.dell.com/sites/channel/Documents/Dell_S500wi_Interactive_Ultra_Short_Throw_Projector_Brochure.pdf</a>
<b>Epson EX 6220</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 1280x800 resolution</li> <li>• 3000 Lumens brightness</li> <li>• 10000:1 contrast</li> <li>• 1.2x digital zoom</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Discontinued</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 5.3lbs</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• \$2967 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>

<b>Website</b>	<a href="http://www.projectorcentral.com/Epson-EX6220-projection-calculator-pro.htm">http://www.projectorcentral.com/Epson-EX6220-projection-calculator-pro.htm</a>
<b>Epson EX 7220</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 3000 lumens brightness</li> <li>• 1280x800</li> <li>• 1000:1 Contrast</li> <li>• 83—816cm image size</li> <li>• HTMI Digital input</li> <li>• Video inputs</li> <li>• 5000 hours of lamp life</li> <li>• HDMI inputs</li> <li>• 1.2x zoom</li> <li>• RS232 Port</li> <li>• USB Port</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> <li>• Comes with carrying case</li> <li>• Wireless</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 1 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 11cm x 30cm x 22cm</li> <li>• 2.3kg</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 3501 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.projectorcentral.com/Epson-EX6220-projection-calculator-pro.htm">http://www.projectorcentral.com/Epson-EX6220-projection-calculator-pro.htm</a>
<b>Hitachi CP-DX250</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 2500 Lumens</li> <li>• 2500:1 Contrast</li> <li>• 4500 hours lamp life</li> <li>• 1024x768 Pixels</li> <li>• ImageCare technology</li> <li>• Deeper black levels</li> <li>• Wall color correction</li> <li>• Filter free design</li> <li>• Comes with remote control, power cord, computer cable</li> <li>• 3d Capable</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Comes with standard warranty</li> <li>• Can purchase extended warranty</li> </ul>

<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 8cm x 26cm x 22cm</li> <li>• 2.2kg</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> <li>• Easy maintenance because the lamp door is on the top of the model</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 2315 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://dmd.hitachi-america.us/products/consumer/digitalmedia/lcd_projectors/lineup/details/CP-DX250.php">http://dmd.hitachi-america.us/products/consumer/digitalmedia/lcd_projectors/lineup/details/CP-DX250.php</a>

### **Hitachi CP-X3030WN**

<b>General Description</b>	<ul style="list-style-type: none"> <li>• 3200 Lumens</li> <li>• 4000:1 Contrast</li> <li>• Manual Focus</li> <li>• Manual Zoom</li> <li>• HDMI input</li> <li>• Video Input</li> <li>• 1024x768 Pixels</li> <li>• RS232 Port</li> <li>• USB Port</li> <li>• Closed Captioning</li> <li>• Crestron</li> <li>• RoomView</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> <li>• Wired Networking</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 3 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 3.1kg</li> <li>• 9cm x 32cm x 25cm</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 4473 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.projectorcentral.com/Hitachi-CP-X3030WN.htm">http://www.projectorcentral.com/Hitachi-CP-X3030WN.htm</a>

<b>InFocus IN112</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 2700 Lumens</li> <li>• 4000:1 Contrast</li> <li>• Manual Focus</li> <li>• Manual Zoom</li> <li>• 34.9-289.3in image size</li> <li>• Video Input</li> <li>• 800x600 Pixels</li> <li>• PC 3D Ready</li> <li>• RS232 Port</li> <li>• USB Port</li> <li>• Closed Captioning</li> <li>• Blackboard Mode</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 1 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 4.8lbs</li> <li>• 2.8cm x 11.8cm x 9.3cm</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 1721 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.projectorcentral.com/InFocus-IN112.htm">http://www.projectorcentral.com/InFocus-IN112.htm</a>
<b>InFocus IN3138H</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 3000 Lumens</li> <li>• 1920x1080</li> <li>• 5000:1 Contrast</li> <li>• HDMI port</li> <li>• Video port</li> <li>• USB port</li> <li>• Ethernet port</li> <li>• Screen Trigger</li> <li>• 3000 hour lamp life</li> <li>• VGA cable, remote control, power cord, and documentation included</li> <li>• Manual zoom and focus</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Compatible with Mac</li> <li>• Wired Networking</li> <li>• Offers simultaneous dual-touch annotation capability on the projection screen with the use of supplied pen devices and drawing software</li> <li>• Wall mount included</li> </ul>

<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 2 year warranty: projector</li> <li>• 6 month warranty: Lamp</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 6.9lbs</li> <li>• 11.2in x 4.8in x 10.3in</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Comes with guides</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Self-installation</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 7008 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.projectorpeople.com/InFocus-IN3138HD/Projector/29604">http://www.projectorpeople.com/InFocus-IN3138HD/Projector/29604</a>
<b>NEC NP-M300XS</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 3000lm brightness</li> <li>• 1024x768</li> <li>• XGA resolution</li> <li>• 1.2 times lens Zoom</li> <li>• 2000:1 contrast ratio</li> <li>• RGB, HDMI digital input</li> <li>• 4000 hours of lamp life</li> <li>• Manual focus</li> <li>• Comes with remote, batteries, power cord, RGB signal cable. Lens cap</li> <li>• Auto power on</li> <li>• ECO Mode technology</li> <li>• Sleep timer</li> <li>• Built-in wall color correction</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> <li>• Compatible with Mac</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• No installation</li> <li>• 3 years</li> <li>• 1 year of InstaCare(next business day exchange)</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 8.8lbs, 4kg</li> <li>• 15.7in x 12.2in x 5.5in</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 5120 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 5 stars</li> </ul>
<b>Website</b>	<a href="http://www.necdisplay.com/p/multimedia-projectors/np-m300xs">http://www.necdisplay.com/p/multimedia-projectors/np-m300xs</a>

<b>NEC NP-M311W</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 2100lm brightness</li> <li>• 1280x800</li> <li>• WXGA resolution</li> <li>• 25 to 300in screen size (diagonal)</li> <li>• 2.3 to 47.8ft Projection distance</li> <li>• 1.7 times lens Zoom</li> <li>• 3000:1 contrast ratio</li> <li>• RGB, HDMI digital input</li> <li>• 4000 hours of lamp life</li> <li>• 33 to 200in screen size (diagonal)</li> <li>• Projection Distance 3.9 to 39.4ft</li> <li>• Manual focus</li> <li>• Comes with remote, batteries, power cord, RGB signal cable, built-in lens cover, carrying case</li> <li>• USB Viewer</li> <li>• Sleep Timer</li> <li>• Built-in wall color correction</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> <li>• Compatible with Mac</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• No installation</li> <li>• 3 years</li> <li>• 1 year of InstaCaare(next business day exchange)</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 6.6lbs, 3kg</li> <li>• 13.4in x 10.1in x 3.9in</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 4311 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.necdisplay.com/p/multimedia-projectors/np-ve281">http://www.necdisplay.com/p/multimedia-projectors/np-ve281</a>



<b>NEC NP-M311X</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 3100lm brightness</li> <li>• 1024x768</li> <li>• 25 to 300in screen size (Diagonal)</li> <li>• XGA resolution</li> <li>• 1.7 times lens Zoom</li> <li>• 1.9 to 45.3ft projection distance</li> <li>• 3000:1 contrast ratio</li> <li>• RGB, HDMI digital input</li> <li>• 5000 hours of lamp life</li> <li>• Manual focus</li> <li>• Comes with remote, batteries, power cord, RGB signal cable, carrying case</li> <li>• Sleep Timer</li> <li>• USB Viewer</li> <li>• Auto power on</li> <li>• Automatic keystone correction</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> <li>• Compatible with Mac</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• No installation</li> <li>• 4 years of InstaCaare(next business day exchange)</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 6.4lbs, 2.9kg</li> <li>• 13.4in x 10.1in x 3.9in</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 3771 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.necdisplay.com/p/multimedia-projectors/np-m311x">http://www.necdisplay.com/p/multimedia-projectors/np-m311x</a>

<b>NEC NP-VE281</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 2800lm brightness</li> <li>• 800x600</li> <li>• SVGA resolution</li> <li>• 1 to 1.1 times lens Zoom</li> <li>• 3000:1 contrast ratio</li> <li>• RGB, HDMI digital input</li> <li>• 4000 hours of lamp life</li> <li>• 33 to 200in screen size (diagonal)</li> <li>• Projection Distance 3.9 to 39.4ft</li> <li>• Manual focus</li> <li>• Comes with remote, batteries, power cord, RGB signal cable</li> <li>• Built-in wall color correction</li> <li>• Direct power-off</li> <li>• Sleep Timer</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> <li>• Compatible with Mac</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• No installation</li> <li>• 2 years of InstaCare(next business day exchange)</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 5.1lbs, 2.3kg</li> <li>• 10.2in x 9.7in x 3.5in</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 1829 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.necdisplay.com/p/multimedia-projectors/np-ve281">http://www.necdisplay.com/p/multimedia-projectors/np-ve281</a>

<b>NEC NP-VE281X</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 2600lm brightness</li> <li>• 1024x768</li> <li>• XGA resolution</li> <li>• 1 to 1.1 times lens Zoom</li> <li>• 3000:1 contrast ratio</li> <li>• RGB, HDMI digital input</li> <li>• 4000 hours of lamp life</li> <li>• Manual focus</li> <li>• Comes with remote, batteries, power cord, RGB signal cable</li> <li>• Built-in wall color correction</li> <li>• Direct power-off</li> <li>• Sleep Timer</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> <li>• Compatible with Mac</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• No installation</li> <li>• 4 years of InstaCaare(next business day exchange)</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 5.1lbs, 2.3kg</li> <li>• 10.2in x 9.7in x 3.5in</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 2298 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4.5 stars</li> </ul>
<b>Website</b>	<a href="http://www.necdisplay.com/p/multimedia-projectors/np-ve281x">http://www.necdisplay.com/p/multimedia-projectors/np-ve281x</a>
<b>Optoma DS325</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 2800 Lumens</li> <li>• 10000:1 Contrast</li> <li>• Manual Focus</li> <li>• Manual Zoom</li> <li>• 22.1-300in image size</li> <li>• Video Input</li> <li>• 800x600 Pixels</li> <li>• PC 3D Ready</li> <li>• RS232 Port</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 1 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 5lbs</li> <li>• 4in x 11.3in x 7.6in</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>

<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 1613 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.projectorcentral.com/Optoma-DS325.htm">http://www.projectorcentral.com/Optoma-DS325.htm</a>
<b>Optoma TTW675UTiM-3D</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 3200 Lumens</li> <li>• 1280x800</li> <li>• 3000:1 Contrast</li> <li>• Manual focus</li> <li>• HDMI port</li> <li>• Computer and video port</li> <li>• USB port</li> <li>• Wireless port</li> <li>• Short-throw projection</li> <li>• PC 3D ready</li> <li>• RS232 Port</li> <li>• USB port</li> <li>• Closed Captioning</li> <li>• Crestron</li> <li>• RoomView</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Compatible with Mac</li> <li>• Interactive</li> <li>• Wired networking</li> <li>• Supplied electronic pen enable on-screen annotations and interactivity</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 3 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 16.8lbs</li> <li>• 8.3in x 16.8in x 16in</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Comes with guides</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Self-installation</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 16450 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.projectorcentral.com/Optoma-TW675UTi-3D.htm">http://www.projectorcentral.com/Optoma-TW675UTi-3D.htm</a>

<b>Optoma W304M</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 3100 Lumens</li> <li>• 10000:1 Contrast</li> <li>• Manual Focus</li> <li>• Manual Zoom</li> <li>• 32.2-375.5in image size</li> <li>• HDMI input</li> <li>• Video Input</li> <li>• 1280x800 Pixels</li> <li>• Full HD 3D</li> <li>• 4000 hour lamp life</li> <li>• USB Port</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 2 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 3.3lbs</li> <li>• 2.8kin x 8.7in x 7in</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 4526 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.projectorcentral.com/Optoma-W304M.htm">http://www.projectorcentral.com/Optoma-W304M.htm</a>
<b>Optoma W306ST</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 3500 Lumens</li> <li>• 15000:1 Contrast</li> <li>• Manual Focus</li> <li>• No Zoom</li> <li>• 40.8-313in image size</li> <li>• HDMI input</li> <li>• Video Input</li> <li>• 1280x800 Pixels</li> <li>• Full HD 3D</li> <li>• Short Throw</li> <li>• RS232 Port</li> <li>• USB Port</li> <li>• 3500 hour lamp life</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> <li>• Full HD 3D</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 3 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 5.9lbs</li> <li>• 3.9in x 11.3in x 9.6in</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>

<b>Ease of Implementation</b>	•
<b>Price</b>	• 4861 Danish Krone
<b>User Reviews</b>	• N/A
<b>Website</b>	<a href="http://www.projectorcentral.com/Optoma-W306ST.htm">http://www.projectorcentral.com/Optoma-W306ST.htm</a>
<b>PowerLite 1940W WXGA 3LCD Projector</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 4200 Lumens</li> <li>• 1280x800</li> <li>• 3000:1 Contrast</li> <li>• 2500 hour lamp life</li> <li>• View JPEG formatted presentations or photos without a computer, using a USB thumb drive</li> <li>• Includes digital, HDMI audio and video connection</li> <li>• 1.6zoom</li> <li>• Closed captioning</li> <li>• Creston integrated partner and RoomView</li> <li>• Display Port</li> <li>• HDMI port</li> <li>• USB port</li> </ul>
<b>Flexibility</b>	• Project two images side-by-side from two different sources simultaneously
<b>Reliability</b>	• 2 year warranty
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 8.5lbs</li> <li>• 14.8in x 10.7in x 3.6in</li> </ul>
<b>Ease of Use</b>	• Comes with guides
<b>Ease of Implementation</b>	• Self-installation
<b>Price</b>	• 7008 Danish Krone
<b>User Reviews</b>	• N/A
<b>Website</b>	<a href="http://www.epson.com/cgi-bin/Store/jsp/Product.do?sku=V11H474020">http://www.epson.com/cgi-bin/Store/jsp/Product.do?sku=V11H474020</a>

<b>PowerLite 1945W WXGA 3LCD Projector</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 4200 Lumens brightness</li> <li>• 1280x800 resolution</li> <li>• High efficiency E-TORL lamp lasts up to 2500 hours in normal mode</li> <li>• Comes with projector, power cable, computer cable, remote control, wireless LAN module, and batteries</li> <li>• Display Port</li> <li>• HDMI compatible</li> <li>• USB port</li> <li>• Crestron Integrated Partner and RoomView</li> <li>• AMX Duet and Device Discovery</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• High-speed LAN module for easy connection to notebooks or mobile devices</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 2 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 14.8in x 10.7in x 3.6in</li> <li>• 8.5lbs</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Comes with guides</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Self-installation</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 9166 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.epson.com/cgi-bin/Store/jsp/Product.do?sku=V11H471020">http://www.epson.com/cgi-bin/Store/jsp/Product.do?sku=V11H471020</a>
<b>PowerLite 1955 XGA 3LCD Projector</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 4500 Lumens</li> <li>• 1024x768 resolution</li> <li>• High-efficiency E-TORL lamp lasts up to 2500 hours in normal mode</li> <li>• 3LCD, 3 chip technology</li> <li>• 3000:1 contrast ratio</li> <li>• AMX Duet and Device Discovery</li> <li>• Crestron Integrated Partner and RoomView</li> <li>• Display Port</li> <li>• HDMI compatible</li> <li>• USB port</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• View JPEG formatted presentations or photos, without a computer, using a USB thumb drive</li> <li>• High-speed LAN module for easy connection to notebooks or mobile devices</li> <li>• Configure and operate projectors remotely over the network</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>•</li> </ul>

<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 14.8in x 10.7in x 3.6in</li> <li>• 8.6lbs</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Comes with manuals</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Self-installation</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 9166 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.epson.com/cgi-bin/Store/jsp/Product.do?sku=V11H490020">http://www.epson.com/cgi-bin/Store/jsp/Product.do?sku=V11H490020</a>
<b>PowerLite 1960W XGA 3LCD Projector</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 5000 Lumens</li> <li>• 1024x768</li> <li>• 3000:1 Contrast</li> <li>• 2500 hour lamp life</li> <li>• Includes digital, HDMI audio and video connection</li> <li>• 1.6x zoom</li> <li>• Closed captioning</li> <li>• Manual zoom and focus</li> <li>• Creston integrated partner and RoomView</li> <li>• Display Port</li> <li>• HDMI port</li> <li>• USB port</li> <li>• Comes with projector, power cable, computer cable, projector remote control, and batteries</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Project two images side-by-side from two different sources simultaneously</li> <li>• Display imaged from your USB hard drive</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 2 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 8.5lbs</li> <li>• 14.8in x 10.7in x 3.6in</li> <li>• 8.5lbs</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Comes with guides</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Self-installation</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 8087 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.epson.com/cgi-bin/Store/jsp/Product.do?sku=V11H473020">http://www.epson.com/cgi-bin/Store/jsp/Product.do?sku=V11H473020</a>



<b>Smart LightRaise 40Wi</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 2500 Lumens</li> <li>• 1280x800</li> <li>• 3000:1 Contrast</li> <li>• VGA input</li> <li>• Touch USB</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Allow for a natural and intuitive approach to collaboration</li> <li>• Students and teachers can interact and learn together using dynamic multitouch gestures like zoom and rotate</li> <li>• Can integrate student devices and other technologies</li> <li>• Both projectors automatically detect whether a pen or finger is being used, without the need to stop and select from a menu</li> <li>• Compatible with Mac</li> <li>• Enables two people to draw and manipulate content on the surface as the same time</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 3 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 28lbs</li> <li>• 14in x 14.75in x 30.25in</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Comes with guides</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Self-installation</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 11864 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="https://smarttech.com/lightraise">https://smarttech.com/lightraise</a>
<b>Sony VPL-DX120</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 2600 Lumens</li> <li>• 2500:1 Contrast</li> <li>• 1600x1200</li> <li>• 30-300in image size</li> <li>• Simple interfaces including HDMI, RGB, and Composite Video</li> <li>• 7000hour lamp life</li> <li>• Equipped with Bright Era 3LCD Panels</li> <li>• 12 bit 3D Digital Gamma Correction</li> <li>• Auto brightness adjustment function depending on the contents</li> <li>• Eco Mode for savings on energy</li> <li>• 1.2x optical zoom</li> <li>• World-Leading SmartEco Technology</li> <li>• Blu-ray Full HD 3D supported</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> <li>• Comes with carrying case</li> </ul>

<b>Reliability</b>	<ul style="list-style-type: none"> <li>• \$59 for 3 year warranty</li> <li>• \$149 for 5 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 5lbs 7 oz.</li> <li>• 12in x 3.5in x 9in</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 4046 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://pro.sony.com/bbsc/ssr/cat-projectors/cat-projmobile/product-VPLDX120/">http://pro.sony.com/bbsc/ssr/cat-projectors/cat-projmobile/product-VPLDX120/</a>
<b>Sony VPL-DX140</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 3200 Lumens</li> <li>• 2500:1 Contrast</li> <li>• 1024x768</li> <li>• 30-300in image size</li> <li>• Simple interfaces including HDMI, RGB, and Composite Video</li> <li>• 7000hour lamp life</li> <li>• Equipped with Bright Era 3LCD Panels</li> <li>• 12 bit 3D Digital Gamma Correction</li> <li>• Auto brightness adjustment function depending on the contents</li> <li>• 1.3x optical zoom</li> <li>• World-Leading SmartEco Technology</li> <li>• Closed Captioning</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> <li>• Comes with carrying case</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• \$59 for 3 year warranty</li> <li>• \$149 for 5 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 5lbs 7 oz.</li> <li>• 12in x 3.5in x 9in</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 6125 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://pro.sony.com/bbsc/ssr/cat-projectors/cat-projmobile/product-VPLDX140/">http://pro.sony.com/bbsc/ssr/cat-projectors/cat-projmobile/product-VPLDX140/</a>

<b>Sony VPL-SW535C</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 3000 Lumens</li> <li>• 1280x800</li> <li>• 2500:1 Contrast</li> <li>• Manual focus</li> <li>• HDMI port</li> <li>• Computer and video port</li> <li>• RS232 Port</li> <li>• Short Throw Wall mount</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Compatible with Mac</li> <li>• Wired Networking</li> <li>• Offers simultaneous dual-touch annotation capability on the projection screen with the use of supplied pen devices and drawing software</li> <li>• Wall mount included</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 3 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 15.4lbs</li> <li>• 6.3in x 15.1in x 16.7in</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Comes with guides</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Self-installation</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 10245 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.projectorcentral.com/Sony-VPL-SW535C.htm">http://www.projectorcentral.com/Sony-VPL-SW535C.htm</a>
<b>ViewSonic PJD5132</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 2800 Lumens</li> <li>• 15000:1 Contrast</li> <li>• Manual Focus</li> <li>• Manual Zoom</li> <li>• 33.5-298.4in image size</li> <li>• Video Input</li> <li>• 800x600 Pixels</li> <li>• PC 3D Ready</li> <li>• RS232 Port</li> <li>• USB Port</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 3 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 4.6lbs</li> <li>• 3.3cm x 10.5cm x 8.7cm</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>

<b>Price</b>	<ul style="list-style-type: none"> <li>• 2681 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.projectorcentral.com/ViewSonic-PJD5132.htm">http://www.projectorcentral.com/ViewSonic-PJD5132.htm</a>
<b>ViewSonic PJD5134</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 3000 Lumens</li> <li>• 15000:1 Contrast</li> <li>• Manual Focus</li> <li>• Manual Zoom</li> <li>• 23.5-298.4in image size</li> <li>• HDMI input</li> <li>• Video Input</li> <li>• 800x600 Pixels</li> <li>• 4500 hour lamp life</li> <li>• PC 3D Ready</li> <li>• RS 232 Port</li> <li>• USB Port</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Portable</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 3 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 4.6lbs</li> <li>• 3.3cm x 10.5cmm x 8.7cm</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Easy to carry, set-up, and power down</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 1975 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.projectorcentral.com/ViewSonic-PJD5134.htm">http://www.projectorcentral.com/ViewSonic-PJD5134.htm</a>

## N.10 Recording / Class Capture

<b>Desire2Learn Capture Software</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Captures synchronized audio, video, and computer screen activity with a click of a button</li> <li>• Can pause recording so instructors are in control of what is and isn't being recorded</li> <li>• Anything presented on screen can automatically be printed by students without the need for instructors to upload the file</li> <li>• Instructors can create a link so the public can view the recording</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Students can record with Tegrity and it is automatically uploaded to the appropriate course where instructors can view it through a separate tab labeled 'Student Recordings'</li> <li>• Instructors can make private or public notes and annotations in the recording</li> <li>• A webcam and microphone records the students taking an online exam as well as all their screen activity and then uploaded for instructors to review at 8x speed</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Software</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Can record with or without an internet connection</li> <li>• Click to start recording, and click again to pause or stop.</li> <li>• Uploaded automatically to the students enrolled in the course to view</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Requires download</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 22983 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.tegrity.com/">http://www.tegrity.com/</a>

<b>Echo360</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Embedded into most CMS/LMS systems including Blackboard, Moodle, ANGEL, iTunes U and custom portals enabling you to deliver you instructional content to students the same way you always have</li> <li>• Integrate into existing room control</li> <li>• Allows you to record in-class content for on-demand viewing and host live webcasts for distance students</li> <li>• Leverage the technology already in place throughout your institution using Echo360 Classroom Capture on existing classroom and podium computers</li> <li>• Professors have the freedom to create and edit customize instructional content</li> <li>• Instructors can leverage existing content from their institutions, researchers and students no matter what tools were used to capture the content</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Can be installed with different bandwidths, number of classrooms, etc.</li> <li>• Can be installed to be compatible with different devices in different classrooms. Ex: projectors, sound systems, computers. Etc.</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Used consistently by various universities</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Software</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• One button to record, one button to save</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Requires installation</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 17777 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://echo360.com/">http://echo360.com/</a>
<b>Juno Tower Receiver</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Combines a portable audio products and a voice-activated lesson capture and sharing feature</li> <li>• Digital multi-speaker 2.1 array</li> <li>• Scans audio 375 times per second to suppress feedback squeal before it starts</li> <li>• Can connect a mp3 player or other audio device</li> <li>• Output with volume control for capturing lectures or to connect personal FM systems</li> <li>• Capture system records screen and audio then automatically titles and prepares the recordings for upload</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Provides both a speaker system and a class capture system</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 5 year warranty</li> </ul>

<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Tower: 14in x 28.25in x 10.4in</li> <li>• 12.5lbs, 5.7kg</li> <li>• Portable audio system and voice-activate lesson capture located in same tower</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Both speaker and receiver are in the ready-to-use tower</li> <li>• Touchscreen</li> <li>• Requires use of pendant microphone</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• No installation</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 8093 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://gofrontrow.com/en/products/frontrow-juno">http://gofrontrow.com/en/products/frontrow-juno</a>
<b>TechSmith</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• TechSmith Relay: consists of a recorder which runs on your computer and the server which processes and publishes all presentations. Interact with videos through Camtasia Relay website and allows anyone to record nearly anything</li> <li>• Camtasia Studio: Program which tunes screen recordings into polished videos that train, teach, and sell</li> <li>• Camtasia for Mac: for a Mac</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Three options based on your needs: TechSmith Relay, Camtasia Studio, and Camtasia for Mac</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Can buy a maintenance program for 25% of the license cost per year</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Software</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Can input photos and videos from computer or mobile device</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Just requires software to download</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• Average 742 Danish Krone per student</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.techsmith.com/">http://www.techsmith.com/</a>

<b>Tegrity</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• A full cloud-based service that requires no servers or classroom-based appliances</li> <li>• Provide automated close captioning for courses</li> <li>• Ensures that recordings are not copied or posted without permission</li> <li>• Can integrate with iTunesU</li> <li>• Can integrate with all major course management systems such as Blackboard, Moodle, etc.</li> <li>• Can edit before upload</li> <li>• Can measure usage</li> <li>• Minimum requirement for recording is a PC or Mac with a microphone and a webcam for video. Can also be integrated with standardized media room environments</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Allows simultaneous connectivity to more than one authentication sources at a time</li> <li>• Can purchase hour based or for full-time equivalent students</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Automated workflow eliminates manual work for IT</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Software</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• A drag and drop interface established a real-time connection between Tegrity and one or more CMS/SIS</li> <li>• Does not require you to manually enter users or courses or schedule recordings at the start of each semester</li> </ul> <p>Do not need servers or classroom based appliances to purchase, install, or maintain</p>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Download</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 97085 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.tegrity.com/">http://www.tegrity.com/</a>



## N.11 Simultaneous Classroom Telepresence

<b>Creative Live! Cam connect HD</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Skype certified for HD 720p video calls at up to 30 fps</li> <li>• H.264 video encoder compresses video streams without compromising on imaged quality and utilizing PC system resources</li> <li>• Auto focus lens</li> <li>• Eliminates background noises</li> <li>• 1280x720 pixels</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Compatible with windows and mac</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 0.8x2.6in</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Includes multi-language quick start guide</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Includes software installation CD</li> <li>• Plug and play</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 378 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 3.8 stars, 28 customer reviews</li> </ul>
<b>Website</b>	<a href="http://us.store.creative.com/Creative-Live-Cam-Connect-HD-Webcam/M/B0067MK1TU.htm">http://us.store.creative.com/Creative-Live-Cam-Connect-HD-Webcam/M/B0067MK1TU.htm</a>
<b>Creative Live! Cam Socialize</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 800x600 resolution</li> <li>• Integrated microphone</li> <li>• Noise cancellation</li> <li>• Fixed Focus</li> <li>• Multi-attach base</li> <li>• Hi-Speed USB 2.0</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Compatible with mac and windows</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 1 year limited warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 227mm x 32mm x 35mm</li> <li>• 0.163kg</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Comes with multi-language quick start guide</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Comes with Software installation CD</li> <li>• Plug and Play</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 378 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 3 stars, 4 reviews</li> </ul>
<b>Website</b>	<a href="http://www.creative.com/mylivecam/products/product.aspx?catID=1&amp;pid=19105">http://www.creative.com/mylivecam/products/product.aspx?catID=1&amp;pid=19105</a>

<b>Creative LabsLive Cam Video IM Ultra</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 1.3 megapixel video quality and capture still images a resolution of up to 5 megapixels</li> <li>• Auto tuning</li> <li>• Noise cancellation technology</li> <li>• Smooth, full motion 30 fps digital video streams and top quality images in High Speed USB 2.0</li> <li>• Works with any USB 1.1 connection</li> <li>• Parental control feature</li> <li>• 4x digital zoom</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Requires windows</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 1 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 6.3in x 3.3in x 7.9in</li> <li>• 10.4ounces</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Comes with installation CD and Quick Start Guide</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Does not provide any driver installation</li> <li>• Plug and play</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 119 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 3 stars, 7 customer reviews</li> </ul>
<b>Website</b>	<a href="http://www.cnet.com/products/creative-labs-live-cam-video-im-ultra/">http://www.cnet.com/products/creative-labs-live-cam-video-im-ultra/</a>
<b>faceVision Touch Cam V1</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Skype certified HD Webcam</li> <li>• Fast autofocus-images stay sharp, even in close-ups with built-in autofocus</li> <li>• Built-in hardware H.264 video encoding</li> <li>• Enjoy low CPU consumption and multitasking while having HD video calls</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Requires windows</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 1 year warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Comes with hardware guide and quick start guide</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Plug and play</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 378 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4.5 stars, 3 customer reviews</li> </ul>
<b>Website</b>	<a href="http://shop.skype.com/webcams/hd-capable/fv-touchcam-v1/">http://shop.skype.com/webcams/hd-capable/fv-touchcam-v1/</a>

<b>GoPro Hero3</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• A high-quality camera</li> <li>• Comes with attachment mounts</li> <li>• Waterproof</li> <li>• Meant for motion</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Records and takes pictures</li> <li>• Attachable mounts allows for many possibilities</li> <li>• Built-in WiFi capabilities allows for remote controlling and transfer of data</li> <li>• Waterproof</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Waterproof</li> <li>• Meant for extreme sports, so durability is very high</li> <li>• High-quality recording; camera won't be the reason movies might be poor</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Unobtrusive</li> <li>• Sleek metal design</li> <li>• Small and compact</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Same controls as regular camera</li> <li>• Few extra features for more customization</li> <li>• Mounts are simple to attach and use</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Needs battery</li> <li>• Plug into computer to transfer files</li> <li>• Otherwise, no challenges</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 1899 dkk</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• No scored reviews</li> <li>• Most reviews seem very impressed by it</li> <li>• Might be too nice for many people's needs</li> </ul>
<b>Website</b>	<a href="http://www.gopro.com">www.gopro.com</a>
<b>GoToMeeting</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Screen Sharing software</li> <li>• Enables you to share screens between multiple users</li> <li>• Browser-based allows easy access</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Multiplatform, including mobile</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Support system in place</li> <li>• Updates regularly</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Software</li> <li>• UI is intuitive</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Very simple</li> <li>• Few instructions needed; just enter a number mostly</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Download and run</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 1942.24 dkk per year</li> </ul>

<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• No reviews</li> <li>• Mostly positive forum posts</li> </ul>
<b>Website</b>	<a href="http://www.gotomeeting.co.uk/">http://www.gotomeeting.co.uk/</a>
<b>Iris LiveView</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Camera that gives 360 panoramic view of classroom</li> <li>• Many educational awards received</li> <li>• Integrated software allows for recording manipulation</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Can be moved to different areas</li> <li>• Records 360 degrees, so no need to position perfectly</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Large support system</li> <li>• If purchased, work with the company in order to properly use</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Sleek design</li> <li>• Can be distracting due to slightly large camera</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Turn on and record</li> <li>• More can be done, but bare minimum is relatively easy</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Need to work with company in order to install hardware and software</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• No listed price; need a quote from company</li> <li>• Developer kit is in excess of 53,951.00 dkk</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• No scored reviews</li> <li>• Most reviews seem very impressed by it</li> <li>• Multiple awards received</li> </ul>
<b>Website</b>	<a href="http://www.therenow.net/classroom_cameras/iris_live_view.php">http://www.therenow.net/classroom_cameras/iris_live_view.php</a>
<b>Logitech C270</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 3 megapixel photos</li> <li>• Built in microphone that reduces background noise</li> <li>• HD 720p video calling</li> <li>• Automatic light correction</li> <li>• Hi-Speed USB 2.0 certified</li> <li>• Pan, tilt, and zoom control</li> <li>• Motion detection</li> <li>• 1280x720 screen resolution</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Im compatibility</li> <li>• Universal clip fits laptops, LCD or CRT monitors</li> <li>• Requires windows</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 2 year limited hardware warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 6in x 8.3in x 3in</li> <li>• 8 ounce3w</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Online manuals and support</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Self-installation</li> </ul>

<b>Price</b>	<ul style="list-style-type: none"> <li>• 216 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4.4 stars, 156 reviews</li> </ul>
<b>Website</b>	<a href="http://www.logitech.com/en-us/product/hd-webcam-c270">http://www.logitech.com/en-us/product/hd-webcam-c270</a>
<b>Logitech C310</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Enjoy widescreen HD 720p video calls on most major IMs</li> <li>• High-resolution snapshots at up to 5 megapixels</li> <li>• Automatic light correction</li> <li>• Noise reduction</li> <li>• 1280x 720 screen resolution</li> <li>• 200 mb hard drive space</li> <li>• Face tracking</li> <li>• Motion detection</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Works with Skype, Windows Live, Messenger, Yahoo! And other popular instant messaging applications</li> <li>• Requires internet connection</li> <li>• Universal clip fits laptops, LCD, or CRT monitors</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 2 year limited hardware warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 6in x 8.25in x 3in</li> <li>• 8 ounces</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Online user guides</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Requires installation of software</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 270 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4.7 stars, 206 reviews</li> </ul>
<b>Website</b>	<a href="http://www.logitech.com/en-us/product/hd-webcam-c310">http://www.logitech.com/en-us/product/hd-webcam-c310</a>
<b>Logitech C615</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Record in Full HD 1080p</li> <li>• Call in HD 720p</li> <li>• Built in autofocus</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Works with both windows and Mac</li> <li>• The fold and go design and short USB cable make it easy to take your webcam with you</li> <li>• You can attach a tripod for more placement options. Plus, the 360-degree swivel makes calling and recording easier at any angle</li> <li>• Take 8-megapixel snapshots</li> <li>• Comes with 3 foot extension cable</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 2 year limited hardware warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 6in x 3in x 8.25in</li> <li>• 8.8 ounces</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>•</li> </ul>

<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Self-installation</li> <li>• No assembly required</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 3778 Danish Kroner</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Website</b>	<a href="http://www.logitech.com/en-us/product/hd-webcam-c615">http://www.logitech.com/en-us/product/hd-webcam-c615</a>
<b>Logitech HD Pro Webcam C920</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Skype in Full HD 1080p</li> <li>• Record full 1080p video clips made possible by H.264 technology</li> <li>• HD 720p video calls to major instant messaging services</li> <li>• Autofocus</li> <li>• Carl Zeiss optics</li> <li>• Natural stereo audio</li> <li>• 15 megapixel snapshots</li> <li>• Automatic noise reduction</li> <li>• Automatic low-light correction</li> <li>• Hi-Speed USB 2.0 certified</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Requires Windows</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 2 year limited hardware warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 8.9in x 2.8in x 7.5in</li> <li>• 2.2 lbs</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Online manual</li> <li>• No assembly required</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 432 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4.5 stars, 1391 customer reviews</li> </ul>
<b>Website</b>	<a href="http://www.logitech.com/en-us/product/hd-pro-webcam-c920">http://www.logitech.com/en-us/product/hd-pro-webcam-c920</a>
<b>LogMeIn</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• IT Support Software</li> <li>• Able to log in to another computer and act like you are sitting in front of it</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Plenty of options and abilities</li> <li>• Can connect to a single computers</li> <li>• Can switch between whose screen is shown</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Comes with a guide</li> <li>• Updates regularly</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Software</li> <li>• UI is intuitive</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Very complicated software to master</li> <li>• Relatively easy to do bare minimum</li> </ul>

<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>Requires installation on multiple computers</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>5988.56 dkk per year</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>No reviews available</li> <li>Mostly positive forum comments</li> </ul>
<b>Website</b>	<a href="https://secure.logmein.com/">https://secure.logmein.com/</a>
<b>Mikogo</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>Screen sharing software</li> <li>Enables you to share screens between multiple computers/users</li> <li>Able to switch between which screen is shown</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>Plenty of options and abilities</li> <li>Can connect to a single computers</li> <li>Can switch between whose screen is shown</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>Comes with a guide</li> <li>Updates regularly</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>Software</li> <li>UI is intuitive</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>Relatively easy to connect between computers</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>Download and run program</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>Free for sharing between 3 users</li> <li>2687.28 dkk for unlimited subscription (allows sharing for up to 25)</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>No reviews available</li> <li>Mostly positive forum comments</li> </ul>
<b>Website</b>	<a href="http://www.mikogo.com/features/">http://www.mikogo.com/features/</a>
<b>Microsoft HD-3000 Webcam</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>720p HD Video</li> <li>16:9 Widescreen</li> <li>TrueColor Technology</li> <li>Noise Cancelling microphone</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>Works with Windows Live Messenger, Yahoo!, AOL Instant Messenger, and Skype</li> <li>Requires Windows</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>3 year limited warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>44.5mm x 109mm</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li></li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>Self-installation</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>223.87 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Website</b>	<a href="http://www.microsoft.com/hardware/en-gb/p/lifecam-hd-3000">http://www.microsoft.com/hardware/en-gb/p/lifecam-hd-3000</a>

<b>Microsoft LifeCam Studio Webcam</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 1080 p HD Widescreen sensor</li> <li>• Auto focus</li> <li>• TrueColor Technology</li> <li>• ClearFrame Technology</li> <li>• High-fidelity microphone</li> <li>• Skype certified</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Requires windows</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 1 year limited warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 40mm x 113mm</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 539 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4 stars, 163 customer reviews</li> </ul>
<b>Website</b>	<a href="http://www.microsoft.com/hardware/en-us/p/lifecam-studio#details">http://www.microsoft.com/hardware/en-us/p/lifecam-studio#details</a>
<b>Samsung TVCam (VG STC2000)</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Skype-to-Skype HD Video Calls</li> <li>• 2x digital zoom</li> <li>• Interface: USB 2.0</li> <li>• LED TV: 2013 F4500, F5300, F5400, F5500, F5700, F6200 ~ F6900, F7100, F7200 2012 EH4500, EH5300, EH5450, ES5500, ES5700 ~ ES6900 (Except ES6003), ES7100 2011 D6500 and above (32" and above)</li> <li>• PDP TV: 2013 F5500 2012 E550, E6500, E7000 2011 D8000</li> <li>• 640x480 resolution</li> <li>• 2 built in microphones</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Connects Skype to any TV or display using a USB port</li> <li>• One USB cord for connectivity and power</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 1 year manufacturer guarantee</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 12 x 60x 110mm</li> <li>• Tilting Support</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Plug and Play</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 1025 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4.5 stars, 127 customer reviews</li> </ul>
<b>Website</b>	<a href="http://www.samsung.com/ca/consumer/tv-video/tv-accessories/VG-STC3000/ZA?subsubtype=others">http://www.samsung.com/ca/consumer/tv-video/tv-accessories/VG-STC3000/ZA?subsubtype=others</a>



<b>Samsung TVCam (VG STC3000)</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Skype-to-Skype HD Video Calls</li> <li>• 2x digital zoom</li> <li>• Interface: USB 2.0</li> <li>• LED TV: 2013 F4500, F5300, F5400, F5500, F5700, F6200 ~ F6900, F7100, F7200 2012 EH4500, EH5300, EH5450, ES5500, ES5700 ~ ES6900 (Except ES6003), ES7100 2011 D6500 and above (32" and above)</li> <li>• PDP TV: 2013 F5500 2012 E550, E6500, E7000 2011 D8000</li> <li>• 640x480 resolution</li> <li>• Comes with lens cover</li> <li>• Two built in microphones</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Connects Skype to any TV or display using a USB port</li> <li>• One USB cord for connectivity and power</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 1 year manufacturer guarantee</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 12 x 0 x 122mm</li> <li>• .113kg</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>•</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Plug and Play</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 522 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4.5 stars, 204 customer reviews</li> </ul>
<b>Website</b>	<a href="http://www.samsung.com/ca/consumer/tv-video/tv-tv-accessories/VG-STC3000/ZA?subsubtype=others">http://www.samsung.com/ca/consumer/tv-video/tv-tv-accessories/VG-STC3000/ZA?subsubtype=others</a>
<b>ScreenLeap</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Screen sharing software</li> <li>• Share by hours per day</li> <li>• Aimed at education purposes</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Many people can watch a single shared screen</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Support system in place</li> <li>• Updates regularly</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Software</li> <li>• UI is intuitive</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Very simple</li> <li>• Few instructions needed</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Download and run</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• Free will you get an hour per day; two for education</li> <li>• 107.90 dkk per month for up to 8 hours per day</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• No reviews</li> <li>• Mostly positive forum posts</li> </ul>
<b>Website</b>	<a href="http://www.screenleap.com">www.screenleap.com</a>

<b>Trust Exis Webcam Chatpack with Headset and Mic</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• Includes webcam and headset with microphone</li> <li>• Webcam with 640 x 480 hardware resolution</li> <li>• USB 2.0 high quality video</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Lightweight stereo headset with adjustable flexible microphone for hands-free communication</li> <li>• Requires windows and a USB port</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 3 years manufacturer's warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Comes in black, green, and pink</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Comes with user guide</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Do not need to install a driver</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 82 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 3.5 stars, 14 reviews</li> </ul>
<b>Website</b>	<a href="http://www.trust.com/en/all-products/17028-exis-chatpack--black">http://www.trust.com/en/all-products/17028-exis-chatpack--black</a>
<b>Trust Primo Webcam</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• 640x480 resolution</li> <li>• 2MPix Snapshot resolution</li> <li>• USB 2.0 high quality video</li> <li>• Built in microphone</li> <li>• Snapshot button to quickly take a picture</li> <li>• Digital zoom and automatic face tracking</li> <li>• Self-adjusting clamp to attach to notebook LCD screens and flat panel monitors or place on flat surfaces</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Requires Windows</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• 3 rear warranty</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• 88x66x87mm</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Comes with user guide</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Driverless technology; no need to install a driver, just plug and go</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 52 Danish Krone</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 3.7 stars, 46 reviews</li> </ul>
<b>Website</b>	<a href="http://www.trust.com/en/all-products/17405-primo-webcam">http://www.trust.com/en/all-products/17405-primo-webcam</a>

## N.12 Studio Sound Equipment

<b>Launchpad Mini</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• A small Launchpad that, when accompanied by a computer, plays sound tracks when the user presses the buttons</li> <li>• Lightweight and portable</li> <li>• Comes with an iPad app, as well as a PC and Mac program</li> <li>• Does not require batteries (powered by the computer or tablet it is plugged into)</li> <li>• Software comes with 1GB of loops (the tracks that the device activates)</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Works with both Mac and PC, as well as the iPad tablet</li> <li>• Portability adds to its flexibility</li> <li>• Works not only with its own software, but also with other MIDI programs</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• No information on reliability</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Standard design</li> <li>• Musical equipment can add to the studio feel</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• Requires knowledge of the software</li> <li>• It will have a slight learning curve</li> <li>• Students might not know what it does just by looking at it</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Only requires the installation of the program / application</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 502 dkk</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4.5 out of 5</li> </ul>
<b>Website</b>	<a href="http://us.novationmusic.com/midi-controllers-digital-dj/launchpad-mini">http://us.novationmusic.com/midi-controllers-digital-dj/launchpad-mini</a>
<b>Launchkey</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• A synthesizer including an integrated launchpad that, when accompanied by a computer, plays sound tracks when the user presses the buttons.</li> <li>• Full-sized keyboard</li> <li>• Comes with an iPad app, as well as a PC and Mac program</li> <li>• Does not require batteries (powered by the computer or tablet it is plugged into)</li> <li>• Software comes with 1GB of loops (the tracks that the device activates)</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Works with both Mac and PC, as well as the iPad tablet</li> <li>• Works not only with its own software, but also with other MIDI programs</li> <li>• Can activate tracks, then play the keyboard over the tracks</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Since it is a full keyboard and not very portable, it might not be handled properly if transported (could be dropped)</li> </ul>

<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Looks very interesting</li> <li>• Musical equipment can add to the studio feel</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• With all the buttons and keys, it could be daunting to a new user</li> <li>• Students can, at the least, use it as a piano</li> <li>• Requires knowledge of the software</li> <li>• It is not very applicable to students who can't play the piano</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Only requires installation of the software</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 1074 dkk</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4 out of 5</li> </ul>
<b>Website</b>	<a href="http://us.novationmusic.com/midi-controllers/launchkey">http://us.novationmusic.com/midi-controllers/launchkey</a>
<b>Launchkey Mini</b>	
<b>General Description</b>	<ul style="list-style-type: none"> <li>• A synthesizer including an integrated launchpad that, when accompanied by a computer, plays sound tracks when the user presses the buttons.</li> <li>• Lap-sized, also portable</li> <li>• Comes with an iPad app, as well as a PC and Mac program</li> <li>• Does not require batteries (powered by the computer or tablet it is plugged into)</li> <li>• Software comes with 1GB of loops (the tracks that the device activates)</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Works with both Mac and PC, as well as the iPad tablet</li> <li>• Works not only with its own software, but also with other MIDI programs</li> <li>• Can activate tracks, then play the keyboard over the tracks</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• No information on reliability</li> </ul>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Looks very interesting</li> <li>• Musical equipment can add to the studio feel</li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• With all the buttons and keys, it could be daunting to a new user</li> <li>• Students can, at the least, use it as a piano</li> <li>• Requires knowledge of the software</li> <li>• It is not very applicable to students who can't play the piano</li> </ul>
<b>Ease of Implementation</b>	<ul style="list-style-type: none"> <li>• Only requires installation of the software</li> </ul>
<b>Price</b>	<ul style="list-style-type: none"> <li>• 507 dkk</li> </ul>
<b>User Reviews</b>	<ul style="list-style-type: none"> <li>• 4.5 out of 5</li> </ul>
<b>Website</b>	<a href="http://us.novationmusic.com/midi-controllers/launchkey-mini">http://us.novationmusic.com/midi-controllers/launchkey-mini</a>

## Appendix O: Criteria Pairwise Comparison Results

	<b>Criteria</b>	<b>Total</b>
<i>Stefan Meisiek</i>	Price	3
	Ease of Use	3
	Ease of Implementation	2
	User Reviews	2
	Flexibility	5
	Reliability	2
	Aesthetics	4
<i>Daved Barry</i>	Price	0
	Ease of Use	5
	Ease of Implementation	3
	User Reviews	1
	Flexibility	2
	Reliability	5
	Aesthetics	5
<i>Steven Taylor</i>	Price	2
	Ease of Use	4
	Ease of Implementation	0
	User Reviews	1
	Flexibility	4
	Reliability	7
	Aesthetics	6
<i>Shannon Hessel</i>	Price	0
	Ease of Use	4
	Ease of Implementation	2
	User Reviews	3
	Flexibility	5
	Reliability	6
	Aesthetics	1
<i>Balder Onarheim</i>	Price	1
	Ease of Use	4
	Ease of Implementation	3
	User Reviews	1
	Flexibility	5
	Reliability	6
	Aesthetics	1

## Appendix P: Decision Matrix Results (Ranked by Overall Score)

Rank	ICT Solution	Criteria Score	Overall Score
1	iPad Retina	70.03	46.22
2	Samsung Galaxy Note	64.89	39.58
3	Google Documents	87.20	23.54
4	eBeam Engage	72.61	18.88
5	Pirate3D Buccaneer	77.57	18.62
6	Cubify Cube 3	73.95	17.75
7	XYZ Printing daVinci 1.0	68.45	16.43
8	CAVE	59.99	15.6
9	GoPro Hero3	85.64	15.41
10	HISONIC	71.84	13.65
11	Launchkey Mini	78.09	13.28
12	Launchkey	71.31	13.16
13	DropBox	87.73	12.28
14	Launchpad Mini	71.31	12.12
15	eBeam Edge	70.79	12.03
16	Audacity	70.31	11.95
17	Wacom DTU-1031	69.10	11.75
18	Apogee MiC	76.34	11.45
19	Wacom DTU-1631	67.35	11.45
20	BrightLink 436Wi Interactive WXGA 3LCD Projector	64.54	10.97
21	SmartBoard 480iv	63.84	10.85
22	BrightLink 595Wi Interactive WXGA 3LCD Projector	63.02	10.71
23	NearPod	74.81	10.47
24	Snowflake	68.62	10.29
25	SurveyGizmo	76.46	9.94
26	IrisLiveView	54.72	9.85
27	SurveyMonkey	75.81	9.85
28	Optoma TTW675UTiM-3D	57.53	9.78
29	TurningTechnologies	73.72	9.58
30	Dell S500WI	55.42	9.42
31	Peachy Printer	62.19	9.33
32	Ultimaker Original	61.97	9.29
33	Gimp	75.98	9.12
34	Photoshop Elements	69.05	8.29
35	Sketchup	88.96	8.01
36	Printbot Assembled Jr	52.03	7.8
37	iClicker	59.40	7.72
38	iHome	81.55	7.34
39	Qualtrics	56.01	7.28

40	Kinivo	80.03	7.2
41	FlexCat	77.93	7.01
42	Juno Tower Receiver	76.46	6.88
43	Bose Soundlink	74.79	6.73
44	BenQ MW519	79.26	6.34
45	Epson EX 6220	75.05	6.33
46	BenQ MW23	75.05	6
47	NEC NP-M311	74.59	6
48	Epson EX 7220	79.15	6
49	NEC NP-VE281X	75.05	5.97
50	AcerX1240	73.06	5.84
51	SonyVPL-DX120	71.31	5.7
52	Hitachi CP-DX250	71.31	5.7
53	BenQ MX520	71.31	5.7
54	SolidWorks	63.25	5.69
55	ClassSpot	63.02	5.67
56	Emotiv Headset	55.53	5
57	Nutone	50.62	4.56
58	Samsung TV Cam(VG-STC3000)	75.81	4.55
59	Samsung TV Cam(VG-STC2000)	74.06	4.44
60	LG TV Camera	73.81	4.43
61	Panasonic TY-CC20W Skype-Enabled Camera	71.52	4.29
62	Echo360	76.46	3.84
63	TechSmith	74.40	3.77
64	Tegrity	72.26	3.61
65	Desire2Learn Capture Software	67.23	3.36
66	TOGO 925RS	66.99	2.68
67	SMART Audio	65.65	2.63
68	Redcat Access	65.35	2.61
69	FrontRow to Go	64.01	2.56
70	FrontRow Pro Digital	60.56	2.42
71	PD-IR Digital System	58.11	2.32
72	Topcat	53.73	2.15
73	ScreenLeap	70.60	0.71
74	Mikogo	67.98	0.68
75	LogMeIn	64.60	0.65
76	GoToMeeting	57.93	0.58

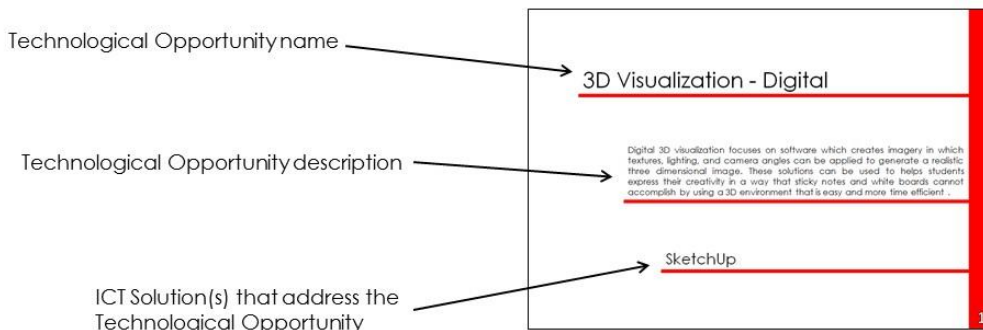


## Appendix Q: Proposal of ICT Solutions



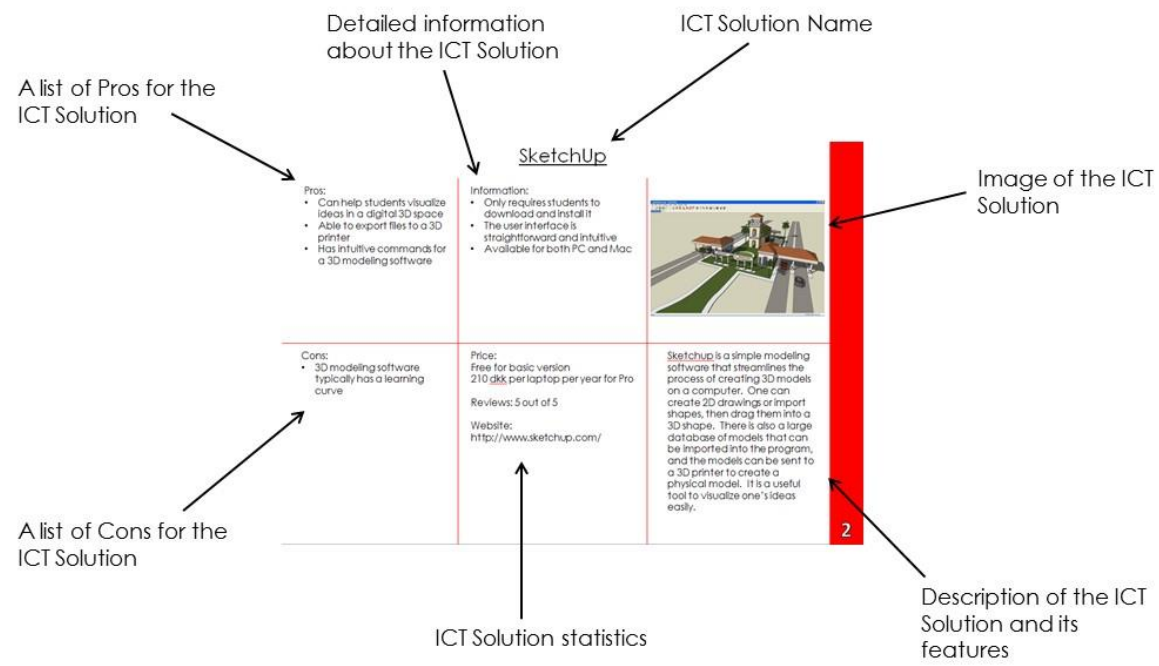
### Overview of the Proposal

This document presents the 21 information communication technologies (ICTs) that we propose to be implemented in the Studio at Copenhagen Business School. This proposal is organized by color-coded chapters. The first chapter is a list of the top five technologies that would benefit the Studio, and the following chapters are 'technological opportunities', or specific areas in the Studio that can be supplemented by technology. Each technological opportunity chapter contains one or two ICT solutions that address it. The figure below describes the content of the chapter pages, and the next page describes the content of the ICT solution pages.





# Overview of the Proposal



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## Top Five Overall

These five technologies address many of the needs of the Studio at CBS. The technologies are ranked based on a combination of their effectiveness and how many of the previous opportunities (3D Visualization, Accessible Sound System, etc.) it addresses.

#1: iPad Retina  
 #2: Google Drive  
 #3: Pirate 3D Buccaneer


#4: eBeam Engage  
 #5: CAVE System

## iPad Retina

<p>Pros:</p> <ul style="list-style-type: none"> <li>The familiar interface means most students know how to use this device already</li> <li>Many stores are able to fix apple devices and answer questions</li> <li>The App Store makes this device incredibly flexible</li> <li>Little to no difficulty in implementation</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>With access to Apple's App Store, the user can download apps that facilitate a variety of activities (drawing, video editing, music creation, etc.)</li> <li>Uses iOS software, which is familiar to many students</li> </ul>	
<p>Cons:</p> <ul style="list-style-type: none"> <li>Relatively expensive if one was to buy more than one iPad</li> </ul>	<p>Price: 2.159 dkk</p> <p>Reviews: 4.5 out of 5</p> <p>Website: <a href="http://store.apple.com/us/buy-ipad/ipad-retina">http://store.apple.com/us/buy-ipad/ipad-retina</a></p> <p>Addresses: Communication, Data Collection, Data Sharing, Interactive Interfaces, Media Manipulation, Presentation Display, and Sound Studio Equipment</p>	<p>The iPad Retina is a commonly used tablet computer that can enable many different classroom activities. It can download millions of applications, many of which are free. It can be connected to TVs or projectors, meaning students can work on an iPad, then present their work to the class, and easily give a presentation.</p>

2

## Google Docs

<p>Pros:</p> <ul style="list-style-type: none"> <li>More storage than Dropbox</li> <li>Offers live collaboration on files</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>Free storage of up to 15GB of files</li> <li>Collaborate live with other users</li> <li>Share files and folders</li> <li>Upload and download documents</li> </ul>	
<p>Cons:</p> <ul style="list-style-type: none"> <li>Can behave weird when some users aren't logged in with a Google Address</li> </ul>	<p>Price: Free</p> <p>Reviews: 4.5 out of 5</p> <p>Website: <a href="http://drive.google.com">drive.google.com</a></p> <p>Addresses: Data Collection, Data Sharing</p>	<p>The user can create or upload files and folders to his or her Google account. The user is also able to share with other users by clicking "Share" and entering their emails. The documents are then editable in real time.</p>


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## Pirate3D Buccaneer

<p>Pros:</p> <ul style="list-style-type: none"> <li>• SmartObjects works on iOS, Android, Mac, PC, and Linux</li> <li>• Claimed to have very few jams due to a patented nozzle that allows for even head distribution</li> <li>• The wireless and smartphone app features make this device very flexible</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>• Comes with 3D model software (SmartObjects) to design objects and send wirelessly to the printer via Wi-Fi</li> <li>• Can also print files from other 3D modeling software</li> <li>• Overall Size: 25.5cm x 25.5cm x 40cm</li> <li>• Build Volume: 14.5cm x 12.5cm x 15cm</li> <li>• Layer resolution: 85 microns</li> <li>• Available in June 2014</li> </ul>	
<p>Cons:</p> <ul style="list-style-type: none"> <li>• Any 3D model software will have some learning curve</li> <li>• For full intended use, it must be connected to Ethernet or Wi-Fi</li> <li>• No user reviews</li> </ul>	<p>Price: 2.681 dkk</p> <p>Reviews: None (available in June 2014)</p> <p>Website: <a href="http://pirate3d.com">http://pirate3d.com</a></p> <p>Addresses: Digital 3D Visualization, Physical 3D Visualization</p>	<p>This 3D printer allows the user to design a model in its multiplatform (PC and Mac, iOS and Android) app called SmartObjects, then send the model wirelessly to the printer over Wi-Fi. The stainless steel design and small size makes it fitting aesthetically for the Studio</p>


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## eBeam Engage

<p>Pros:</p> <ul style="list-style-type: none"> <li>• All of the features make this device very flexible</li> <li>• Not intrusive to whiteboards</li> <li>• Can enhance presentations</li> <li>• Easy to implement (it is magnetic, or it can be mounted by a bracket)</li> <li>• Has an active tech support</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>• Has a large quantity of features and applications at the user's disposal</li> <li>• When paired with a projector, the white board becomes an interactive screen</li> <li>• By itself, it can capture activities performed on the whiteboard</li> </ul>	
<p>Cons:</p> <ul style="list-style-type: none"> <li>• Requires knowledge on how to use it (but it comes with a guidebook)</li> </ul>	<p>Price: 5.390 dkk</p> <p>Reviews: 4.5 out of 5</p> <p>Website: <a href="http://www.e-beam.com/education/ebeam-engage/overview.html">http://www.e-beam.com/education/ebeam-engage/overview.html</a></p> <p>Addresses: Accessible Sound System, Interactive Interfaces, Presentation Display, Recording/Class Capture</p>	<p>The eBeam Engage is a magnetic receiver that one can place on the side of a whiteboard, then plug into a computer. Pairing the eBeam Engage with a projector allows the whiteboard to become an interactive presentation tool. It also includes a remote control with a full keyboard, touch pad, and page scrolling buttons, for manual, physical control. Other features include a speaker to play audio from a computer or music playing devices, a microphone to record presentations, and a scroll knob to navigate presentations.</p>

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## CAVE System

<p>Pros:</p> <ul style="list-style-type: none"> <li>• Users are commonly blown away by this technology</li> <li>• Brings virtual reality to a new level</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>• The manufacturer can design a unique setup to suit the needs of the individual customer</li> <li>• It is used for a variety of purposes (data analysis, gaming, presenting)</li> </ul>	
<p>Cons:</p> <ul style="list-style-type: none"> <li>• Prohibitively expensive</li> <li>• Long implementation process</li> <li>• Requires extremely high-end computer hardware</li> <li>• It can be invasive when it is not in use</li> <li>• Requires calibration and training to use</li> </ul>	<p>Price: nearly 5.395.000 dkk for a low end version, but varies dramatically depending upon the setup</p> <p>Reviews: 5 out of 5</p> <p>Website: <a href="http://www.mechdyne.com/cave.aspx">http://www.mechdyne.com/cave.aspx</a></p> <p>Addresses: Digital 3D Visualization, Interactive Interfaces, Presentation Display</p>	<p>This system aims to immerse the user within a virtual space. It puts the user in the center of a number of walls with projected displays, and calibrates to the user's head so he or she appears to be in the middle of a virtual environment. The CAVE system tracks the user's motion, allowing him or her to interact with the space.</p>

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## 3D Visualization - Digital

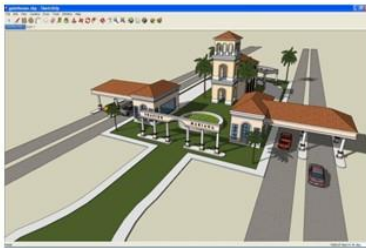
Digital 3D visualization focuses on software which creates imagery in which textures, lighting, and camera angles can be applied to generate a realistic three-dimensional image. It allows students to easily conceptualize complex 3D designs.

## SketchUp

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## SketchUp

<p>Pros:</p> <ul style="list-style-type: none"> <li>• Can help students visualize ideas in a digital 3D space</li> <li>• Able to export files to a 3D printer</li> <li>• Has intuitive commands for a 3D modeling software</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>• Only requires students to download and install it</li> <li>• The user interface is straightforward and intuitive</li> <li>• Available for both PC and Mac</li> </ul>	
<p>Cons:</p> <ul style="list-style-type: none"> <li>• 3D modeling software typically has a learning curve</li> </ul>	<p>Price: Free for basic version 210 dkk per laptop per year for Pro</p> <p>Reviews: 5 out of 5</p> <p>Website: <a href="http://www.sketchup.com/">http://www.sketchup.com/</a></p>	<p>SketchUp is a simple modeling software that streamlines the process of creating 3D models on a computer. One can create 2D drawings or import shapes, then drag them into a 3D shape. There is also a large database of models that can be imported into the program, and the models can be sent to a 3D printer to create a physical model. It is a useful tool to visualize one's ideas easily.</p>

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## 3D Visualization - Physical

Similar to digital 3D visualization, physical 3D visualization can be used to help in visual learning. It allows for the creation of models and objects that are frequently used in a studio environment. Physical 3D visualization can create a variety of challenging objects in which students would be unable to create with their hands.

Pirate 3D Buccaneer

Cubify Cube 3

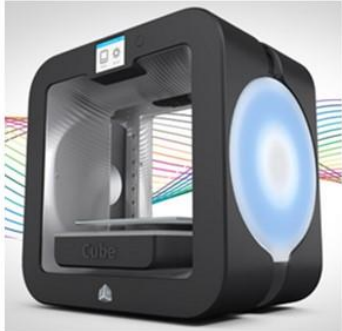
9

## Pirate3D Buccaneer

<p>Pros:</p> <ul style="list-style-type: none"> <li>• SmartObjects works on iOS, Android, Mac, PC, and Linux</li> <li>• Claimed to have very few jams due to a patented nozzle that allows for even head distribution</li> <li>• The wireless and smartphone app features make this device very flexible</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>• Comes with 3D model software (SmartObjects) to design objects and send wirelessly to the printer via Wi-Fi</li> <li>• Can also print files from other 3D modeling software</li> <li>• Overall Size: 25.5cm x 25.5cm x 40cm</li> <li>• Build Volume: 14.5cm x 12.5cm x 15cm</li> <li>• Layer resolution: 85 microns</li> <li>• Available in June 2014</li> </ul>	
<p>Cons:</p> <ul style="list-style-type: none"> <li>• Any 3D model software will have some learning curve</li> <li>• For full intended use, it must be connected to Ethernet or Wi-Fi</li> <li>• No user reviews</li> </ul>	<p>Price: 2.681 dkk</p> <p>Reviews: None (available in June 2014)</p> <p>Website: <a href="http://pirate3d.com">http://pirate3d.com</a></p>	<p>This 3D printer allows the user to design a model in its multiplatform (PC and Mac, iOS and Android) app called SmartObjects, then send the model wirelessly to the printer over Wi-Fi. The stainless steel design and small size makes it a fitting aesthetic for the Studio</p>

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## Cubify Cube 3

<p>Pros:</p> <ul style="list-style-type: none"> <li>• The user can print models without having to connect his or her computer</li> <li>• Manufacturers claim that it is easier to change the plastic filament than it is to change ink cartridges in a standard printer</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>• Claims to print twice as fast as competitors</li> <li>• Build Volume: 15cm all dimensions</li> <li>• Overall Size: 34cm x 34cm x 28cm</li> <li>• Available in 2<sup>nd</sup> quarter of 2014</li> <li>• Uses recyclable ABS and compostable PLA plastic</li> </ul>	
<p>Cons:</p> <ul style="list-style-type: none"> <li>• Currently no user reviews</li> <li>• Relatively high price</li> <li>• Models from the company's database also have to be purchased</li> </ul>	<p>Price: 5.395 dkk</p> <p>Reviews: None (not available yet)</p> <p>Website: <a href="http://cubify.com/en/Cube">http://cubify.com/en/Cube</a></p>	<p>This 3D printer allows the user to design a model in its multiplatform (iOS, Android, and Windows) app, then send the model wirelessly to the printer over Wi-Fi. The touch screen allows users to search the company's large database of objects and find a model to print, without the use of external hardware (such as a computer). It is desk-sized, so it can fit in an office or a classroom easily.</p>

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## Accessible Sound System

In a studio environment, it is important for instructors to communicate with students in different rooms or groups. In an interactive learning situation, various activities are going on at all times, and communication with students can be difficult. Through the use of an accessible sound system, instructors can easily communicate to students within the Studio. Students working on projects may also take advantage of a sound system by using it for presentations or music that enhance their project.

### FlexCat

### eBeam Engage

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### FlexCat

#### Pros:

- Integrated microphone
- It allows users to play audio through an audio jack

#### Information:

- Battery life: 10+ Hours
- Wireless Range: 200ft
- Dimensions: 8.5" x 5" x 3.5"
- Comes with group speakers, remote, charging station, and classroom speaker
- Can connect multimedia audio



#### Cons:

- Currently has no user reviews

#### Price:

10780 dkk (Two Speakers)  
 12884 dkk (Three Speakers)  
 14988 dkk (Four Speakers)  
 17092 dkk (Five Speakers)  
 19196 dkk (Six Speakers)

#### Reviews: None

Website: <http://www.lightspeed-tek.com/products/flexcat/>

A 4-6 piece audio system that provides two-way communication for small group instruction. Teachers are able to listen in and communicate with each group through a central monitoring speaker. Teachers have a remote where they can select to talk to individual groups or the whole class. Also includes a charging base and a classroom speaker to enable whole group instruction.

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## eBeam Engage

### Pros:

- Easy access to a speaker
- Also has multiple other features that increases its educational value

### Information:

- Has an audio in / out port
- Users can plug in their computers or mp3 players to play music or audio with the JBL speaker on the device



### Cons:

- Not very flexible as a sound system (it is meant to be a feature of the device, not the main intent)

Price: 5.390 dkk

Reviews: 4.5 out of 5

Website:

<http://www.e-beam.com/education/ebeam-engage/overview.html>

The eBeam Engage is a magnetic receiver that one can place on the side of a whiteboard, then plug into a computer. Pairing the eBeam Engage with a projector allows the whiteboard to become an interactive presentation tool. It also includes a remote control with a full keyboard, touch pad, and page scrolling buttons, for manual, physical control. Other features include a speaker to play audio from a computer or music playing devices, a microphone to record presentations, and a scroll knob to navigate presentations.

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## Communication

Communication between students and Professors prevent thoughts and ideas from being misunderstood. Students may not understand lecture material, what is expected from assignments, or when assignments are due. Good communication with students inside and outside of the classroom are both factors that can benefit a student's education.

FlexCat

NearPod

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## FlexCat

<p>Pros:</p> <ul style="list-style-type: none"> <li>• Integrated microphone</li> <li>• Facilitates group activities, which are a common aspect of studio learning</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>• Battery life: 10+ Hours</li> <li>• Wireless Range: 200ft</li> <li>• Dimensions: 8.5" x 5" x 3.5"</li> <li>• Comes with group speakers, remote, charging station, and classroom speaker</li> <li>• Can connect multimedia audio</li> </ul>	
<p>Cons:</p> <ul style="list-style-type: none"> <li>• Currently no user reviews</li> </ul>	<p>Price:</p> <p>10.780 dkk (Two Speakers)  12.884 dkk (Three Speakers)  14.988 dkk (Four Speakers)  17.092 dkk (Five Speakers)  19.196 dkk (Six Speakers)</p> <p>Reviews: None</p> <p>Website: <a href="http://www.lightspeed-tek.com/products/flexcat/">http://www.lightspeed-tek.com/products/flexcat/</a></p>	<p>A 4-6 piece audio system that provides two-way communication for small group instruction. Teachers are able to listen in and communicate with each group through a central monitoring speaker. Teachers have a remote that allows them to select to talk to individual groups or the whole class. Includes a charging base and a classroom speaker to enable whole group instruction.</p>

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## NearPod

<p>Pros:</p> <ul style="list-style-type: none"> <li>• All device types (mobile, tablet, laptop)</li> <li>• All Operating Systems (OS X, iOS, Windows, Android)</li> <li>• Free</li> <li>• Can share lessons with other teachers</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>• Available for all device types (smartphones, computers, tablets)</li> <li>• Available for all major operating systems</li> <li>• Students can respond to questions from their device</li> <li>• Measure and track student performance</li> </ul>	<p>STUDENTS RECEIVE MULTIMEDIA CONTENT IN REAL TIME AND PARTICIPATE ACTIVELY IN CLASS.</p> 
<p>Cons:</p> <ul style="list-style-type: none"> <li>• Less in-person communication</li> <li>• Likely not useful for some Studio classes</li> <li>• Some shared lessons cost money</li> </ul>	<p>Price: Free</p> <p>Reviews: 3.5 out of 5</p> <p>Website: <a href="http://www.nearpod.com">www.nearpod.com</a></p>	<p>This application facilitates the sharing of presentations, webpages, and graphics. A professor can open the app on their device (tablet, phone, laptop), and touch the "start class" button. Students open the app on their devices and input a class ID PIN, then the professor can share relevant information with his or her students by sending it directly to their smartphones or tablets.</p>

**THIS TECHNOLOGY DID NOT PASS THE FACULTY VALIDATION SURVEY: CBS already has software (CBS Learn) that has this functionality.**

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# Data Collection


When working on projects, students may be required to gather statistical information. To do this, polling technology must be used. Software can be used to make this process easier and to help organize and graph results.

## SurveyMonkey

## Google Forms


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### SurveyMonkey

<p>Pros:</p> <ul style="list-style-type: none"> <li>• Free up to 100 surveys sent</li> <li>• Most popular polling service</li> <li>• Use on browser or through mobile app</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>• Popular polling / surveying tool</li> <li>• Free for most common use</li> <li>• Use through browser</li> <li>• Can be used through mobile app</li> <li>• Simple to use</li> <li>• Support for many languages (including Danish)</li> <li>• Social media and email integration</li> </ul>	
<p>Cons:</p> <ul style="list-style-type: none"> <li>• Costs to send more than 100 surveys</li> <li>• Free for only the first ten surveys created</li> </ul>	<p>Price: Free</p> <p>Reviews: 4 out of 5</p> <p>Website: <a href="http://www.surveymonkey.com">www.surveymonkey.com</a></p>	<p>SurveyMonkey is a free, easy to use survey tool. The user is able to make surveys, each with various types of questions. Then, one can automatically send the survey to up to 100 people for free.</p>

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## Google Forms

<p>Pros:</p> <ul style="list-style-type: none"> <li>• Simple use</li> <li>• Free</li> <li>• Covers all basic polling and data summary</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>• Free for most common use</li> <li>• Easy to use</li> <li>• Basic polling software</li> </ul>	
<p>Cons:</p> <ul style="list-style-type: none"> <li>• Concerns exist about data from Google being gathered by American National Security Agency</li> <li>• Less visually appealing than other options</li> <li>• Not as advanced as other options</li> </ul>	<p>Price: Free</p> <p>Reviews: 4 out of 5</p> <p>Website: <a href="https://drive.google.com">drive.google.com</a></p>	<p>Google Forms are free, easy to use survey tools. Create a survey by specifying the type and content for each question. The user can easily send the survey to an email list. While it has fewer features than other survey options, this makes it simpler and possibly satisfies all of the user's needs.</p>

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## Data Sharing

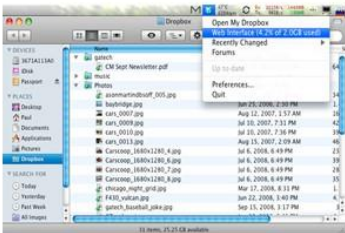
Studio learning often focuses on students working collaboratively on a project. In order for students to successfully work together, they may have to share their work and progress with other members in their group. Various software allows this to be easily done, so students can let others see their materials. It also enables students to work on the same document simultaneously.

Dropbox

Google Docs


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## Dropbox

<p>Pros:</p> <ul style="list-style-type: none"> <li>• Free up to 2 GB of files</li> <li>• Simple to use</li> <li>• File sharing between collaborators</li> <li>• Files backed up on the cloud</li> <li>• Desktop application automatically syncs</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>• 2GB of free file storage</li> <li>• Files backed up on cloud</li> <li>• Files can be shared between users</li> <li>• Desktop app acts like any other folder and does all of the work</li> </ul>	
<p>Cons:</p> <ul style="list-style-type: none"> <li>• No live editing (offered by Google Docs)</li> <li>• Less file storage than Google Docs</li> </ul>	<p>Price: Free</p> <p>Reviews: 4.3 out of 5</p> <p>Website: <a href="http://www.dropbox.com">www.dropbox.com</a></p>	<p>The user only needs to create an account and download the desktop application. Files are then able to be saved on a server - one can log into <a href="http://dropbox.com">dropbox.com</a> and access these files from any computer. These folders can be used to share documents with students - right click on a folder or document, click "Share", and enter another user's Dropbox username or email.</p>

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## Google Drive

<p>Pros:</p> <ul style="list-style-type: none"> <li>• More storage than Dropbox</li> <li>• Offers live collaboration on files</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>• Free storage of up to 15GB of files</li> <li>• Collaborate live with other users</li> <li>• Share files and folders</li> <li>• Upload and download documents</li> </ul>	
<p>Cons:</p> <ul style="list-style-type: none"> <li>• Can behave weird when some users aren't logged in with a Google Address</li> </ul>	<p>Price: Free</p> <p>Reviews: 4.5 out of 5</p> <p>Website: <a href="http://drive.google.com">drive.google.com</a></p>	<p>The user can create or upload files and folders to his or her Google account. The user is also able to share with other users by clicking "Share" and entering their emails. The documents are then editable in real time.</p>

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## Interactive Interfaces


The Studio provides a very interactive learning environment. Many classes focus on groups in which students work together on a project. An interactive interface creates a touch-screen technology that provides students a way to physically change and edit data.

### eBeam Engage

### eBeam Edge


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### eBeam Engage

<p>Pros:</p> <ul style="list-style-type: none"> <li>• All of the features make this device very flexible</li> <li>• Not intrusive to whiteboards</li> <li>• Can enhance presentations</li> <li>• Easy to implement (it is magnetic, or it can be mounted by a bracket)</li> <li>• Has an active tech support</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>• Has a large quantity of features and applications at the user's disposal</li> <li>• When paired with a projector, the white board becomes an interactive screen</li> <li>• By itself, it can capture activities performed on the whiteboard</li> </ul>	
<p>Cons:</p> <ul style="list-style-type: none"> <li>• Requires knowledge on how to use it (but it comes with a guidebook)</li> </ul>	<p>Price: 5.390 dkk</p> <p>Reviews: 4.5 out of 5</p> <p>Website:  <a href="http://www.e-beam.com/education/ebeam-engage/overview.html">http://www.e-beam.com/education/ebeam-engage/overview.html</a></p>	<p>The eBeam Engage is a magnetic receiver that one can place on the side of a whiteboard, then plug into a computer. Pairing the eBeam Engage with a projector allows the whiteboard to become an interactive presentation tool. It also includes a remote control with a full keyboard, touch pad, and page scrolling buttons, for manual, physical control. Other features include a speaker to play audio from a computer or music playing devices, a microphone to record presentations, and a scroll knob to navigate presentations.</p>

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## eBeam Edge

<p>Pros:</p> <ul style="list-style-type: none"> <li>• Does not interfere with white board work</li> <li>• Can enhance presentations</li> <li>• Easy to implement (it is magnetic, or it can be mounted by a bracket)</li> <li>• Has an active tech support</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>• The white board becomes an interactive screen when content is projected on top of it.</li> <li>• By itself, it can capture activities performed on the whiteboard</li> </ul>	
<p>Cons:</p> <ul style="list-style-type: none"> <li>• There is a learning curve for the software</li> </ul>	<p>Price: 3.884 dkk</p> <p>Reviews: 4 out of 5</p> <p>Website:  <a href="http://www.e-beam.com/education/ebeam-edge/overview.html">http://www.e-beam.com/education/ebeam-edge/overview.html</a></p>	<p>The eBeam Edge is a magnetic receiver (pictured on the left) that one can place on the side of a whiteboard, then plug into a computer so that the actions performed on the whiteboard (drawing with markers, tapping the board with their included stylus) are translated to the computer. When paired with a projector, the whiteboard can become an interactive presentation tool.</p>

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## Media Manipulation

Media Manipulation focuses on software that creates imagery, where textures, lighting, and effects can be applied to edit and enhance an image. These solutions can be used to help students express their creativity in a way that markers and white boards cannot accomplish by using software that is simple and time efficient. Students can use it to enhance their presentations and proposals by creating a more professional feel.

## Gimp

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## Gimp

<p>Pros:</p> <ul style="list-style-type: none"> <li>• Very popular open-source projects</li> <li>• Good documentation and lots of online tutorials on basic functions</li> <li>• Free</li> <li>• All Operating Systems, even Linux</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>• Edit photos with the same power as Photoshop</li> <li>• Free</li> <li>• Available on Windows, OS X, and Linux</li> <li>• Difficult to use for those new to photo editing</li> </ul>	
<p>Cons:</p> <ul style="list-style-type: none"> <li>• Difficult to use (but all photo editors are)</li> </ul>	<p>Price: Free</p> <p>Reviews: 4 out of 5</p> <p>Website: <a href="http://www.gimp.org">http://www.gimp.org</a></p>	<p>A free photo editing software that replicates the functionality of Photoshop. Features include tools for layering, shading, and coloring.</p>

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## Presentation Display

Presentations are used to engage and help students visualize information. Students can show pictures, videos, charts, and slideshows to a whole classroom through the use of a presentation display. They can also be used by students to display media for a project or presentation they are involved in.

BenQ MW23

Epson EX6220

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## BenQ MW523

<p>Pros:</p> <ul style="list-style-type: none"> <li>• 1 year warranty</li> <li>• Has video inputs</li> <li>• RS232 Port and USB Port</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>• Brightness: 3000 Lumens</li> <li>• Weight: 2.3kg</li> <li>• Size: 11cm x 30cm x 22cm</li> <li>• Image Size: 80cm-772cm</li> <li>• Digital input: HDMI</li> <li>• Focus and Zoom Manually</li> <li>• 1280x800 resolution</li> </ul>	
<p>Cons:</p> <ul style="list-style-type: none"> <li>• No reviews</li> </ul>	<p>Price: 2.681 dkk</p> <p>Reviews: None</p> <p>Website:  <a href="http://www.projectorcentral.com/BenQ-MW523.htm">http://www.projectorcentral.com/BenQ-MW523.htm</a></p>	<p>A classroom projector with a 1280x800 resolution which can be moved anywhere in a classroom to display an image onto any surface.</p>

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## Epson EX6220

<p>Pros:</p> <ul style="list-style-type: none"> <li>• 1 Year Warranty</li> <li>• Has Video Inputs</li> <li>• RS232 and USB Port</li> <li>• Comes with a carrying case</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>• Brightness: 3000 Lumens</li> <li>• Weight: 2.4kg</li> <li>• Size: 8cm x 29cm x 23cm</li> <li>• Image Size: 83cm-816cm</li> <li>• Digital input: HDMI</li> <li>• Focus and Zoom Manually</li> <li>• 1280x800 resolution</li> </ul>	
<p>Cons:</p> <ul style="list-style-type: none"> <li>• No Reviews</li> </ul>	<p>Price: 3.232 dkk</p> <p>Reviews: None</p> <p>Website:  <a href="http://www.projectorcentral.com/Epson-EX6220.htm">http://www.projectorcentral.com/Epson-EX6220.htm</a></p>	<p>A classroom projector with a 1280x800 resolution which can be moved anywhere in a classroom to display an image onto any surface.</p>

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## Recording/Class Capture


In many lecture halls, Professors are starting to record classes, enabling students to re-watch a class. Class recording technologies are also being used so students can watch a lecture before class, and then implement what they learned in the lecture during class time. In a studio learning environment, students may use this technology to record their presentations and projects, and to look back at the recordings for reflections.

### Echo360

### GoPro Hero3


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## Echo360

<p>Pros:</p> <ul style="list-style-type: none"> <li>• Can be installed with different bandwidths, number of classes, etc.</li> <li>• Can be installed to be compatible with numerous devices in multiple classrooms</li> <li>• Used consistently by various universities</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>• Embedded into most CMS/LMS systems including Blackboard, Moodle, ANGEL, iTunes U and custom portals enabling you to deliver your instructional content to students the same way you always have</li> <li>• Integrate into existing room control</li> <li>• Allows you to record in-class content for on-demand viewing and host live webcasts for distance students</li> <li>• Leverage the technology already in place throughout your institution</li> <li>• Professors have the freedom to create and edit customize instructional content</li> </ul>	
<p>Cons:</p> <ul style="list-style-type: none"> <li>• No reviews</li> <li>• Requires installation</li> </ul>	<p>Price: 17.777 Danish Krone</p> <p>Reviews: None</p> <p>Website: <a href="http://echo360.com">http://echo360.com</a></p>	<p>Echo360 is a lecture capture system which enables faculty to record audio, visuals, and video for students to access online in a digital format. Once installed, faculty need to select "start recording", configure their microphone, and set a title for their recording. Captures are started, stopped, and paused by pressing "start capture", "pause capture", and "stop capture". To publish, all faculty need to do is press the "publish recording" button.</p>

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## GoPro Hero 3

<p>Pros:</p> <ul style="list-style-type: none"> <li>• High-quality recording meant for motion</li> <li>• Waterproof, highly durable</li> <li>• Mounts allow for versatility in placement</li> <li>• Built-in Wi-Fi for remote controlling</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>• 720p - 1080p resolution, 30 fps, Ultra wide – Medium Field of View</li> <li>• Camera: 74g</li> <li>• Rechargeable battery</li> <li>• Two mounts are provided, others available for purchase</li> <li>• GoPro app allows Wi-Fi use</li> </ul>	
<p>Cons:</p> <ul style="list-style-type: none"> <li>• Plenty of room for user error</li> <li>• Mounts can be distracting or obtrusive</li> </ul>	<p>Price: 1.899 dkk</p> <p>Reviews: 4 out of 5</p> <p>Website: <a href="http://www.gopro.com">www.gopro.com</a></p>	<p>GoPro is a durable, waterproof, mobile, high-definition camera. It comes with a mount that allows it to be attached to various surfaces, including your head, a wall, or a bike. It has built-in Wi-Fi, allowing for remote recording and control.</p>

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## Simultaneous Classroom Telepresence

Many professors in the Studio expressed interest in the ability to have classrooms communicate with professors in different countries, or for students to work with other students in a different country. By having the technological means for a simultaneous classroom telepresence, Professors and students would have the means to communicate and work with anyone.

Samsung TV Cam VG-STC3000  
 Samsung TV Cam VG-STC2000


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## Samsung TV Cam VG-STC3000

<p>Pros:</p> <ul style="list-style-type: none"> <li>• Lens Cover to protect privacy</li> <li>• Two built in microphones</li> <li>• Comes with USB cable</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>• Skype-to-Skype HD Video Calls</li> <li>• 2x digital zoom</li> <li>• Interface: USB 2.0</li> <li>• LED TV: 2013 F4500, F5300, F5400, F5500, F5700, F6200 ~ F6900, F7100, F7200 2012 EH4500, EH5300, EH5450, ES5500, ES5700 ~ ES6900 (Except ES6003), ES7100 2011 D6500 and above (32" and above)</li> <li>• PDP TV: 2013 F5500 2012 E550, E6500, E7000 2011 D8000</li> <li>• 640x480 resolution</li> </ul>	
<p>Cons:</p> <ul style="list-style-type: none"> <li>• Currently unavailable</li> </ul>	<p>Price: 529 dkk</p> <p>Reviews: 4.5 out of 5</p> <p>Website:  <a href="http://www.samsung.com/ca/consumer/tv-video/tv/tv-accessories/VG-STC3000/ZA?subsubtype=others">http://www.samsung.com/ca/consumer/tv-video/tv/tv-accessories/VG-STC3000/ZA?subsubtype=others</a></p>	<p>Connects to any TV or display using a USB port.</p>

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## Samsung TV Cam VG-2000

<p>Pros:</p> <ul style="list-style-type: none"> <li>• Lens Cover to protect privacy</li> <li>• Two built in microphones</li> <li>• Comes with USB cable</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>• Skype-to-Skype HD Video Calls</li> <li>• Plug and Play for easy set-up</li> <li>• 3x digital zoom</li> <li>• Interface: USB 2.0</li> <li>• Compatible with: 2012 EH4500, EH5300, EH5450, ES5500, ES5700, ES6100, ES6300, ES6400, ES6500, ES6700, ES6800, ES6900, ES7100, ES7200(only for CIS) 2011 D6500, D7000, D8000, D9500, 2012 E550, E6900, E7000 2011 D8000</li> <li>• 640x480 resolution</li> </ul>	
<p>Cons:</p>	<p>Price: 1.025 dkk</p> <p>Reviews: 4.5 out of 5</p> <p>Website:  <a href="http://shop.skype.com/webcams/tv/webcams/samsung-vg-stc2000/">http://shop.skype.com/webcams/tv/webcams/samsung-vg-stc2000/</a></p>	<p>Connects to any TV or display using a USB port.</p>

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# Sound Studio Equipment

Sound Studio Equipment allows students to express their creativity through sound by playing tracks, performing, and recording. This is another medium that students can work with to help in projects and presentations, as well as provide additional hands-on learning.

## Launchkey

## Launchkey Mini

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### Launchkey

#### Pros:

- Flexible device (the user can use it to play tracks, play the keys, or do both at the same time)
- Creative tool; adding creative devices can benefit the studio environment

#### Information:

- Has a full-sized keyboard
- Comes with the Novation iPad app and computer program
- Software contains 1GB of loops (the tracks that the device can activate)
- Works with both Mac and PC
- Doesn't require batteries (it is powered by the device it is connected to)



#### Cons:

- If students do not know how to play the instrument, they will not use it
- The user has to learn the software to use the Launchpad feature

Price: 1.074 dkk

Reviews: 4 out of 5

#### Website:


<http://us.novationmusic.com/midi-controllers/launchkey>

The Launchkey is a synthesizer-style keyboard with a launchpad (the yellow and green buttons) and sliders that allows the user to activate and deactivate tracks while playing. It automatically detects and maps to most software when connected to a computer, or one could connect it to an iPad or computer and use the Novation Launchkey app. It is a very useful tool for creating or recording music with studio-like features.

**THIS TECHNOLOGY DID NOT PASS THE PROFESSOR VALIDATION SURVEY: Half of the surveyed professors did not believe that they would want to use this device.**

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## Launchkey Mini

<p>Pros:</p> <ul style="list-style-type: none"> <li>• Small size makes it portable</li> <li>• Flexible device (the user can use it to play tracks, play the keys, or do both at the same time)</li> <li>• Creative tool; adding creative devices can benefit the studio environment</li> </ul>	<p>Information:</p> <ul style="list-style-type: none"> <li>• It is "lap-sized" (27 keys)</li> <li>• Comes with the Novation iPad app and computer program</li> <li>• Software contains 1GB of loops (the tracks that the device can activate)</li> <li>• Works with both Mac and PC</li> <li>• Doesn't require batteries (it is powered by the device it is connected to)</li> </ul>	
<p>Cons:</p> <ul style="list-style-type: none"> <li>• If students do not know how to play the instrument, they will not use it</li> <li>• The user has to learn the software to use the Launchpad feature</li> </ul>	<p>Price: 507 dkk</p> <p>Reviews: 4.5 out of 5</p> <p>Website:  <a href="http://us.novationmusic.com/midi-controllers/launchkey-mini">http://us.novationmusic.com/midi-controllers/launchkey-mini</a></p>	<p>The Launchkey Mini is a synthesizer-style keyboard with a launchpad allows the user to activate and deactivate tracks while playing. It automatically detects and maps to most software when connected to a computer, or one could connect it to an iPad or computer and use the Novation Launchkey app. It is an extremely useful tool for creating and recording music with studio-like features, and it is portable for easy transport across a room, building, or a city. As the "mini" version, it has reduced functionality, but requires less customization and knowledge.</p>