The Efficacy of Screencasting Technology in the Classroom.

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by

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CERTIFICATE OF APPROVAL

Approved and recommended for acceptance as a thesis in partial fulfillment of the requirements for a degree of Master of Science in Information Design and Technology

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ABSTRACT

A study that investigates the efficacy of screencasts. As a tool used for instruction, screencasting can be significant in reaching out to broader ranges of learners in the classroom. Through the utilization of the screencast, the teacher can work towards compartmentalizing instruction and create a repository of lessons. This repository of screencasts can assist in present and future curriculum and lesson development. By having these screencasts available to the student, the teacher can provide a more one-to-one instructional setting that will help raise the comprehension and understanding of the content that is being demonstrated.
# TABLE OF CONTENTS

Certificate of Approval ........................................... ii.

Abstract .................................................................. iii.

Table of Contents ....................................................... iv.

List of Tables and Figures ........................................... v.

Introduction ............................................................... 1

Evaluating the Screencast Process ............................... 11

Implementing Screencasts in the Classroom ................. 26

References ................................................................. 31
List of Tables and Figures

Figure 1: Screencasting framework and corresponding instructional strategies.

Figure 2: Dynamic screen movement as used in Selection Tools – Lasso Tool.

Figure 3: Text overlay used to focus attention in Clonestamp and Blur.

Figure 4: Screencasts published to SchoolSpace for viewing.

Table 1: Evaluating Screencast Software

Table 2: Screencasts and Instructional Goals
**Introduction**

This review of literature will serve to outline several different areas of screencasting and learning styles. First, it will examine the learning styles of students and how teachers work to accommodate those needs. Next, it will consider the screencasting technology itself. Background information of screencasting will be identified including what the technology is and the structural elements and instructional strategies that go into making a screencast. Finally, it will look at ways screencasts are being used in education, including implementation strategies and challenges.

The methods that a good teacher uses in order to instruct his or her students should be centered on the individual needs of the student. In 1983, Howard Gardner developed the Theory of Multiple Intelligences. The theory proposes that the way people learn can be categorized in eight different ways: musical, rhythmic, spatial, mathematical, interpersonal, intrapersonal, and natural. Gardner’s theory has been widely accepted in education, and “has been used as the foundation in the design behind instructional and curricular content” (Morales 2006).

Coinciding with the Theory of Multiple Intelligences are the varying learning styles. These learning styles include visual, auditory and kinesthetic. The challenge for any teacher is trying to successfully instruct a class, while accommodating the needs of individual students. With the heightened pace of growth in learning technologies, there is a wide growth that “has provided teacher and tutors with many more opportunities to
explore the most suitable mix of teaching and learning styles for a given task” (Gulc 2006). More critical to the success are the increasingly available Internet and web-based communications. The use of such tools in the classroom has given way to the term ‘blended learning,’ a scenario that allows teachers to “develop, promote, and evaluate the combination of established ways of Learning and Teaching and the opportunities offered by technology in order to improve students’ learning and increase flexibility in how, when and where they study” (Gulc 2006). Essentially, this allows students who benefit under different learning styles to be included no matter what material or skills are being taught. One could argue that these technologies make it easier for the teacher to adapt to the different learning styles of his or her students. An example of one such technology that could allow this is the implementation of screencasts. This technology will serve as the focal point for the research.

The term screencast is a term that was coined by Jon Udell in 2005 and is a way for an individual to present “a digitally recorded playback of computer screen output which often contains audio narration” (Sugar 2010). Screencasts, which often contain voice-over narration, are useful for demonstrating how to use specific operating systems, software or website features. An important difference between screencasts and another broadcasting medium, the podcast, is that the actions of the user on a computer screen are being recorded whereas in a podcast it is restricted to an audio recording only (Rocha 2009). This movie could include additional visual enhancements such as graphics or text in conjunction with or in lieu of the audio commentary. As this media includes a
multitude of written, audio, and video elements, it can help to reach students that have a variety of learning preferences.

The method for distributing these screencasts is very similar to that of a podcast. Screencasts can be available for distribution via a Really Simple Syndication or RSS feed in which a user is notified when new screencasts are available. The user can connect by these RSS feeds directly to the recording or can check a variety of other locations including topic specific blogs and other Web pages (Educause 2006). The use of screencasts is a relatively new concept as Internet connections have greatly improved and it has become easier and more affordable for users to generate and publish content.

In order to develop a screencast for use in education, it is critical that there is an understanding of common elements and strategies that can be implemented. William Sugar, Abbie Brown and Kenneth Luterbach of East Carolina University in 2010 conducted an analysis of screencasts in order to better obtain an understanding of utilizing them as online instructional tools. The study consisted of an analysis of two different sets of instructional screencasts focused on teaching specific computing procedures: the first set were a series of screencasts they had produced and the second set were professionally produced screencasts. The hope was that by looking closely at both sets of screencasts, they would be able to identify common structural elements as well as instructional strategies that corresponded (Sugar 2010).
After reviewing the initial set of self-produced screencasts, they found that there were several structural elements and instructional methods common amongst the six they had analyzed. With the elements and methods established, they moved on to examining professionally produced screencasts to see if “structure and common format components were generalizable to the larger pool of publicly available screencasts” (Sugar 2010). At the conclusion of examining 37 screencasts that totaled two hours of content, they determined there indeed was a common thread of structural elements and instructional strategies.

Sugar, Brown and Luterbach determined that there were a total of three structural elements to a screencast: 1) bumpers, 2) screen movement and 3) narration. Bumpers were noted as a “statement of identity” that could be found at the beginning and/or end of a screencast (Sugar 2010). Next, the element of screen movement was differentiated between both dynamic and static types of movement. Dynamic screencast movement was where the cursor would be followed and remained in the center whereas with static screencast movement the cursor moved within a constant frame. Dynamic movement was more common in advanced screencasts and they hypothesized that “designers may feel the need to keep the screen static for beginners because they do not have a well-developed schema for the screen… [where] advanced users have an overall mental model of the entire screen and can concentrate on portions of the screen” (Sugar 2010). Finally, the use of narration was found to exist as an explicit description and/or in combination with an implicit description. The explicit description coincided with the action occurring on the screen such as “click on Edit then click on Select All”, while implicit description
would generalize the step taking place such as “create a new file” and learn by observing the action taking place (Sugar 2010).

In addition to the three structural elements identified by Sugar, Brown and Luterbach, they also determined there were five instructional strategies commonly used in the screencasts evaluated: 1) provide overview, 2) describe procedure, 3) present concept, 4) focus attention and 5) elaborate content. In providing an overview, the screencast creator outlines expectations for the screencast. In doing so, the learner will understand how it ties not only into the specific concept covered but also the way it can be connected into other topics. The strategy of describing the procedure is perhaps the largest component, as this is when the specific task is being demonstrated and explained to the learner. Embedded along side the described procedure is also the presentation of concepts. This is where the instructor will offer an explanation of a specific concept that directly relates to the screencast topic. Sugar, Brown and Luterbach state that “This combination of describing a concept related to the procedure along with demonstrating the procedure itself appeared to be an effective instructional strategy” (Sugar 2010). To ensure that the learner is aware of the central ideas within the screencast, there is the need to focus attention. In this regard, the instructor would use narration and/or cursor location to direct the learner’s attention as needed. Moving the cursor around in a circular fashion or having the frame suddenly zoom in on an area of the screen are two methods for achieving this visually. The final instructional strategy identified is providing the instructor an opportunity to elaborate content within the screencast. This strategy allows the creator the opportunity to further enrich the learner’s understanding going beyond the
specific topic of the screencast. For example, an instructor could elaborate with “advice about how best to use a particular tool or technique described in the screencast” (Sugar 2010).

As seen in Figure 1, these structural elements and instructional strategies as outlined by Sugar, Brown and Luterbach could serve as the foundation for creating effective screencasts. Not only is it likely that the screencasts would have continuity, but also could help to simplify and streamline the process for another instructor to dive into the world of screencast creation.

The pedagogical application of screencasts has been applied to help support the needs of students. Generally, these can be categorized into three areas: 1) lecturing, 2) tutoring and 3) remediation. Technologies like the screencast have been believed to impact all areas of education with “up-to-date content, addressing multiple intelligences and the anytime/anywhere delivery of instructional content” (Morales 2006).

Screencasts can help to serve as a way to create blended learning among the...
different categories. This cohesive mix with other types of education is “about developing skills and knowledge by engaging and challenging the learner in different ways” (Gulc 2006).

The benefits of implementing screencasts in the classroom do not come without their concerns, as issues with developing screencasts in education are not non-existent. As with implementation of any technology, there are concerns that may arise. Additional time for the teacher to adapt to produce the screencasts, implementing procedures and software problems are all legitimate concerns. Robert Olliges, a Web Authoring and Design instructor at Webster University used Captivate, a recommended screencasting program from his Faculty Development Center to produce critiques of student work and provide them feedback. He reported issues with the screen capturing software crashing when recording a session. Ollige stated that “In accordance with the requirements of the assignment, the students created pages with many graphics. This caused the Captivate program to crash during the session.” (Olliges 2009). Instructors are making additional efforts to enhance instruction with the use of screencasts, and problems such as this only create frustration and increase the amount of time the instructor spends to fix a problem instead of adding to instruction. A drawback to screencasts themselves is that they are not interactive. The screencast in an instructional setting that is focused on the aspect of creating lessons that “lend themselves to fixed demonstrations” and it should be noted that “Good screencasts depend on planning a session with an eye toward its being recorded and on thoughtful editing afterwards” (Educasue 2006). If the author of a
screencast does not maintain a specific focus then it could include irrelevant information that would not be effective in instilling information to the learner.

The *International Review of Research in Open and Distance Learning* published a study in 2007 by Elaine Peterson of Montana State University that examined the implementation of a screencasts in an online course: “Organization of Information in a School Library Media Center”. One unit that offered a problem was in the “Classification” unit as it is involved in examining the Dewey Decimal Classification System. In the traditional classroom setting, instructors could “physically point down the pages to show students that they need to keep refining the classification numbers to arrive at the most exact classification number” (Peterson 2007). For an online class, it wouldn’t be feasible to scan the pages to such an extent; this would provide an opportunity to utilize a screencast. Peterson developed a screencast based on the comments and challenges faced by the students in the class. The students that sampled the screencasts had “affirmed that they were much more capable of navigating the Dewey database online because of the screencasts” (Peterson 2007). This help to support the notion that screencasts can be used to show a demonstration to foster a better understand of a concept and process.

In the July 2011 issue of *The Turkish Online Journal of Educational Technology* research conducted by Ahmad Mohamad Ali, Khairulanuar Samsudin, Mohamad Hassan and Salman Sidek identified the effects of creating screencasts that included narration and those without narration to enhance learning performance. In the study, the researchers
provided a series of six screencasts to two different groups of undergraduates aimed at demonstrating how to complete a variety of tasks in the Flash animation software. One group utilized screencasts that included narration, while the second group utilized screencasts without narration. The pre-test and post-test that was provided to both groups involved them creating an animation using the Flash software. A statistical one-way ANOVA test was used to analyze the data that was collected.

The pre-test identified that there was no advantage of prior knowledge to any of the learners in either group. In examining the post-test data, the researchers found that learners using the screencast with narration obtained a better mean score than those learners using the screencast without narration. The results indicated “narration supported in the instructional screencast had been very helpful for successful learning, especially for learners with low prior knowledge in this study” (Mohamad 2011). Though the benefits of adding narration to a screencast were identified in the study, further discussion of the researchers stressed other considerations that should be made. They concluded that screencasts used for instruction can be time-consuming and that instructors “should ground their designs based on current research findings and theories…this research suggests that short and simple screencast with narration support has an advantage in promoting better learning” (Mohamad 2011). In reflecting on this study, an instructor should consider the issue of narration; however, there should also be consideration in condensing the length of the screencast in order to reduce the time-consumption for both learner and the instructor in its creation.
There are opportunities where the teaching and learning can be more student-centered. What would the impact be where students created the screencasts?

Aurora Rocha and Clara Coutinho of Minho University in Portugal detailed one implementation of a screencast in high school environment. The approach taken in this study was to have the teachers familiarize themselves with Jing, a screencast creating application, and then demonstrate its abilities to students in a geometry class. The thought behind the study is that students would create specific screencasts based on different topics that aligned with the national exams. These “GeomCasts” would be generated by students and in turn “can give much contribution by allowing a more personalized learning, where the student took on an active role as a manager and builder of knowledge” (Rocha 2009). The teacher assigned groups along with topics and established deadlines for the GeomCasts. Upon completion, they would be reviewed and published to the class blog where students had access and could review for tests. In this study, the focus was largely placed on the student-centered creation of screencasts to encourage collaboration and to develop a stronger understanding of concepts. In reviewing the questionnaire that was provided to the students, the research showed that a majority seemed to feel that it did improve their ability in understanding the concept. In response to the question “Did you like to watch the GeomCasts? Why?” students responded with “Yes, because we learned how to solve the exercises and got our doubts answered with the explanation given in the solving of the exercise, besides being a technological format, which arises more interest” (Rocha 2009). At the time this study was published, there were limited final test results to reveal if the creation of the GeomCasts had a direct
impact or not. However, Rocha and Coutinho found in the preliminary results that “the students showed great interest, either in the concepts explanations provided by the teacher, or the exercises made by the group, having most of the students stated that they were of great utility in the support of the study and the preparation for the final exam” (Rocha 2009). The study revealed that students creating screencasts with the facilitation of a teacher could help to improve learning and comprehension as it addressed multiple learning modalities in many ways.

The ultimate challenge, however, in screencasts is developing a process and addressing the challenges along the way. Educause finds that with “judicious editing, an instructor can re-sequence the elements of a lesson, eliminate awkward or unnecessary parts, and craft a focused presentation that is easy to follow and uses students’ time efficiently” (Educause 2006). While certain considerations have been identified in the research, there are still numerous aspects that need to be addressed based on an individual instructor's skill-level and resources that are available. Software packages to choose from, the production process along with the distribution and implementation are all keys parts in determining the efficacy of screencasts for Imaging Technology students in a high school environment.

**Evaluating the Screencast Process**

This study focused on the efficacy of a high school teacher utilizing technology to create screencasts. The course titled “Imaging Technology” is a high school class taught in
Richmond, Virginia that teaches students about digital photography. An emphasis of the course is making use of the “digital darkroom”, which includes using the computer and digital imaging manipulation software, Adobe Photoshop CS3, in order to complete a variety of tasks. The teacher is charged with the task of instructing the students in a variety of software processes, and students are expected to use these methods and techniques to manipulate their own digital images. As a teacher, the challenge is to constantly make changes and develop their resources in order to assist with student learning. At the heart of this study is determining whether the process of creating and utilizing screencasts is effective in a high school setting.

In order to proceed with this study, the teacher needed to evaluate different software packages to create the screencasts and consider several different distribution methods of the screencasts to the students. Once the evaluation of software and distribution had been established, the next phase was to identify screencast topics and establish a production process so that there was continuity throughout. A series of production notes was established as the production process evolved and, at the conclusion of the study, a set of fifteen screencasts were created on a variety of different topics specific to the class that the teacher instructed.

**Software Evaluation**

In August of 2011, the teacher first began examining what software packages were available to create screencasts. The results of a “screencast software” Google search yielded dozens of different options and, in order to sift through the different packages, a
set of criteria were established. First, in order for the software to be considered there needed to be a Macintosh Operating System compatible version. This was essential as the teacher was using Macintosh computers and would be creating the screencasts to demonstrate a Mac-specific license of Adobe Photoshop CS3. A second criterion identified was cost. It was considered to be ideal if the software package was completely free, but there was a maximum budget set at one hundred dollars as needed. The third criterion to be considered was the ability to edit the screencast directly in the same package. It was important to be able to trim and edit the video recorded, along with overlaying text directly within the program instead of having to export to another application such as Apple’s iMovie or Final Cut Pro video editing suites. Lastly, the software package would have to have the ability to export to a variety of different file formats to provide flexibility when making considerations for distribution to the students. A desired ability was to be able to publish directly to a video sharing site such as YouTube or Vimeo. In total, four different software packages were evaluated. To evaluate the usefulness of each application a similar sample demonstration was recorded with each. Photoshop was launched, an image was opened, and then simple color and lighting adjustments were made to see how the recording software would respond.

The two free software packages, ActivInspire and Jing, were the first to be considered because of their affordability. The first, ActivInspire, is a software package that was available within the school division, as it is made to interact with Promethean hardware technology for interactive whiteboards. The software is designed to work as an interactive Microsoft PowerPoint, but includes a tool that allows for screen recording.
Though the screen recorder feature worked, the limitations of the program exceeded the benefit of the free pricing. The computer seemed to perform slowly while the program was recording, and the playback quality of what was recorded was not smooth and easy to see. Another severe limitation was its inability to edit or overlay text within the video as well. As the output was only to AVI, it required using another third party application to convert the video before being editable in either iMovie or Final Cut Pro. In evaluating TechSmith’s Jing, the playback quality was good, but the program did not allow for any text overlay or editing and trying to convert the video from SWF was cumbersome and quite time consuming. It was also noted that it only allowed for a maximum of five minutes of content to be recorded at a time. An advantage of Jing was that it allows for the easy publishing of screencasts to its own sharing site where they could be linked to from other sites or blogs or be directly embedded so the viewer would not need to leave page they were visiting.

The last pair of software packages to be evaluated each were priced at one hundred dollars: TechSmith’s Camtasia (for Mac) and Telestream’s ScreenFlow. Each application did a good job at good video quality recordings and provided the option to include voice narration while recording the screencast or in the included postproduction editing phase; this is a feature not available in either ActivInspire or Jing. The ability to trim and edit video were both simple to accomplish in each Camtasia as well as ScreenFlow as the interface was similar to Apple’ iMovie application, which the teacher was familiar with. Both applications offered a multitude of output formats, including both being able to directly publish to a YouTube channel; ScreenFlow edged out slightly as it allows for
direct Vimeo publishing as well. In considering differences between the two, ScreenFlow offered more control over call-out features such as displaying the keys that are pressed on the keyboard. This was a significant advantage when considering software, since the screencasts being made were to be used to demonstrate how Photoshop works and keyboard commands are an important aspect.

Table 1 provides a list of the different software packages that were evaluated. Each was considered for its cost, the ability to add narration, text overlay, trimming and editing abilities, and the available output formats including whether it could directly publish to YouTube or Vimeo.

Table 1  
Evaluating Screencast Software

<table>
<thead>
<tr>
<th>Company</th>
<th>Title</th>
<th>Platform</th>
<th>Cost</th>
<th>Narration</th>
<th>Text Overlay</th>
<th>Trim/Edit Video</th>
<th>Output Formats</th>
<th>YouTube/Vimeo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promethean</td>
<td>ActivInspire</td>
<td>Mac/PC</td>
<td>*</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TechSmith</td>
<td>Camtasia</td>
<td>Mac/PC</td>
<td>Mac $99/PC $299 (30 day trial)</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>AVI, FLV, H.264, SWF, WMV</td>
<td>YouTube</td>
</tr>
<tr>
<td>TechSmith</td>
<td>Jing</td>
<td>Mac/PC</td>
<td>Free (2GB storage)</td>
<td>√</td>
<td></td>
<td></td>
<td>SWF</td>
<td></td>
</tr>
<tr>
<td>Telestream</td>
<td>ScreenFlow</td>
<td>Mac</td>
<td>$99 (30 day trial)</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>H.264, QuickTime-all, WMV</td>
<td>Youtube/Vimeo</td>
</tr>
</tbody>
</table>

* - school division software already licensed from hardware purchase

In the end, ScreenFlow was selected as the screencast creating application for the study, as it seemed to offer a more comfortable editing environment. The ability for advance call-out features was seen as a boost for making stronger screencasts. Compared to Camtasia, ScreenFlow offered some shortcuts in the interface that were perceived as time-savers for the teacher; this was a crucial benefit when outlying the efficacy of making the screencasts themselves.
Distribution Methods

From the inception of the study, it was determined that the screencasts would be published to the Internet rather than a local intranet so that they would be available in a variety of places. The teacher intended for the majority of the screencasts to be accessed while in the classroom. Additional opportunities access the screencasts throughout the school or outside might be beneficial as well.

For distributing the screencasts some considerations needed to be made. The Internet filter setup in our school served as an initial obstacle because it restricts certain video sharing websites from being used, and this would include restricting one of the most popular, YouTube. Recently the school division had changed the restriction of Vimeo, and this was a viable option. Rather than providing links to other websites, another opportunity presented itself. The school division allowed teachers to create and distribute content through an online learning management system, known as SchoolSpace, and was supported by the company Angel. Within SchoolSpace, the screencast video file could either be directly uploaded to the class group, or a page could be created where the content could be embedded from Vimeo.

Utilizing SchoolSpace in some way made sense because it was a familiar environment for both the teacher for distributing content and the student for accessing content. In deciding whether to upload the content to the SchoolSpace server or embed the screencasts in SchoolSpace that would be hosted at Vimeo, Internet speed was the determining factor.
Content either uploaded or retrieved directly from the SchoolSpace server was much faster when done from on campus compared to an embedded Vimeo file. Since the screencasts were mostly to be viewed in the classroom, the teacher could benefit from quicker upload times and students would have to spend less time waiting for the videos to load. After the aforementioned considerations, the teacher opted to publish screencasts directly to the SchoolSpace server as the method of distribution.

**Screencast Production Process**

The process of creating a screencast was divided into three different phases: 1) preproduction (planning), 2) production (recording), 3) postproduction (editing) and 4) publishing. To begin in the preproduction phase, the teacher first needed to choose a topic. Selecting a topic for which to create a screencast was determined based on the teacher’s perception of student necessity. This determination came about in deciding not only what technique or process the student would need to know for the current assignment, but also whether the technique or process was important enough that it carried enough value to be revisited in the future for another assignment. It was important the screencasts being created would help in demonstrating techniques or processes that would be valuable throughout the duration of the class to maximize the value of the time spent in the production process.

During the preproduction phase, in addition to selecting a topic, the teacher needed to make two preparations: outline and mimic student perspective. An outline of a particular process or technique would need to be created. The outline would mimic what would
actually be covered during the class presentation in order to minimize confusion that could be caused in differences between the lesson and the screencast. This way what they would view would be the same process outlined during the class. Segmenting the outline into key sections also made this more manageable from a teacher’s perspective as it was recorded. This would allow pause points throughout the recording so that the teacher could stop a recording, collect their thoughts and then continue recording. In using the outline, the teacher was less likely to make mistakes during the demonstration and stray off topic, which in turn would help to save valuable time. The outline also helped to make sure that any key points or ideas would be stated and demonstrated throughout the screencast. Another aspect of preparing to record the screencast was to ensure that the setup on the computer would mimic what the student would view. This could include making the Dock appear the same as a student workstation along with preparing project folders and making sure files were in place. This helped for explaining where things were located on the computer, as well as making the target audience feel more comfortable viewing the screencast. The intent was to make sure the students focused more on the demonstration, rather than noticing differences in the workspace and software.

The production phase consisted of using ScreenFlow to capture the screen movements. ScreenFlow allows for multiple recordings to be assembled together when editing, so it provided the opportunity to stop the recording at certain points. This would allow the teacher to collect their thoughts and prepare for a new section within the screencast. Another advantage to stopping the recording could be the reduction of editing time. For example, not recording the load or rendering times in Photoshop would mean that those
segments would not need to be trimmed or sped up later while editing. Depending on how complex the narration would be, it could have been included while the screen movements were being recorded or added later on in the postproduction phase.

Once the screen movements had been recorded, the next step involved the postproduction phase. At this point, a lot of time was spent to make sure that emphasis on key parts of the demonstration were best highlighted. Throughout the study, this process became easier over time as more and more screencasts were developed. Though with the ease, more time was spent to learning advanced features within ScreenFlow to help place emphasis. More complex comments and narration may have been added during this time as with clips becoming increasingly trimmed so that the screencast would get straight to the concept trying to be taught.

Borrowing from the study by Sugar, Brown, and Luterbach, the teacher implemented structural elements and instructional strategies that they had identified throughout the production of the screencasts in their study (Sugar 2010). For example, in examining the screencast entitled Selection Tools – Lasso Tool, there is the structural element of the bumper at the beginning of the video with the use of an opening title to indicate what the screencast will cover. In addition to the bumper, the teacher made use of narration techniques including explicit and implicit descriptions such as when explaining how to use the lasso tool and what it can do while showing it actually being used. The structural element of screen movement was an obvious component of the screencast; however, the teacher used a combination of dynamic and static movement. Considerations were made
to make sure that the majority of the screen would show a close-up of the demonstration was important to maximize the quality as seen in Figure 2. The instructional strategies were implemented mostly during the postproduction phase. The editing of the screencast allowed for fluid movement from start to finish. For each screencast, the teacher provided an overview that gave a rationale for viewing the particular topic. In the screencast *Backing Up Your Images*, the teacher justifies the topic in saying, “In case anything happens to your image and you accidentally save over something without meaning to, you can always go back to your original photos.” Within the screencasts the teacher also described the procedure that was being demonstrated. As in *Contact Sheet*, the narration explained the necessary steps that should be followed to successfully create a contact sheet with the desired dimensions and settings. The teacher also presented concepts and elaborated content where the screencasts would provide insight into different areas that would relate to the procedural knowledge being covered. Though the instructional goal of the screencast *Portrait Collage* was to show students all of the steps to complete an assignment from start to finish, additional concepts were covered to assist in understanding how the instructional goal was to be met. The teacher would elaborate on the concepts of layers and opacity to provide further insight into the procedural knowledge being covered.
Finally in the postproduction phase, the teacher needed to ensure that there was focused attention of the student. To accomplish this, the teacher utilized different text overlays, cursor movements and zoomed or highlighted parts of the screencast to focus the attention as seen in Figure 3.

For the last step of the screencast production process, the teacher needed to publish the finished screencast to the online learning management system, SchoolSpace. Using ScreenFlow, the screencast was exported as an H.264 QuickTime movie file that was viewable with anyone that had the QuickTime player installed on his or her computer. Once exported, the movie file was uploaded into the class section called Tutorials as seen in Figure 4. Students could then opt to view the
screencast by downloading it locally to their computer or stream it directly from within SchoolSpace.

Table 2 provides a description of each of the screencasts that were developed along with the instructional goal. A total of fifteen different screencasts were created and covered a wide range of topics from how to complete the *Adobe Classroom in a Book* tutorials to how to use specific tools and how to complete an entire project from start to finish.

**Table 2**

*Screencasts and Instructional Goals*

<table>
<thead>
<tr>
<th>Screencast</th>
<th>Instructional goal</th>
<th>Screencast duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACIAB Lesson 1 – 01A</td>
<td>How to complete “The Coin” tutorial.</td>
<td>8:07</td>
</tr>
<tr>
<td>ACIAB Lesson 1 – 01B</td>
<td>How to complete “Beach Cleanup” tutorial.</td>
<td>5:05</td>
</tr>
<tr>
<td>ACIAB Lesson 1 – Overview</td>
<td>How to use the ACIAB lesson book for the class and what you will be doing in Lesson 1.</td>
<td>2:12</td>
</tr>
<tr>
<td>ACIAB Lesson 2</td>
<td>How to complete the ACIAB Lesson 2 tutorial.</td>
<td>20:00</td>
</tr>
<tr>
<td>Backing Up Your Images</td>
<td>How to copy and preserve original images for a photography assignment.</td>
<td>2:20</td>
</tr>
<tr>
<td>Clonestamp and Blur</td>
<td>How to use the clonestamp and blur tools. Used to complete the Clonsetamp and Blue tutorial.</td>
<td>12:02</td>
</tr>
<tr>
<td>Contact Sheet</td>
<td>How to create a contact sheet so that all of the pictures from an assignment are viewable.</td>
<td>3:53</td>
</tr>
<tr>
<td>Creating Class and Project Folders</td>
<td>How to create a class and project folder on their local workstation in the correct location.</td>
<td>0:58</td>
</tr>
<tr>
<td>MS Word PART 1</td>
<td>How to open, use toolbars, change page orientation and saving into the correct location in Microsoft Word.</td>
<td>1:31</td>
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<tr>
<td>MS Word PART 2</td>
<td>How to use text boxes, Word Art and insert pictures in Microsoft Word.</td>
<td>5:11</td>
</tr>
<tr>
<td>Portrait Collage</td>
<td>How to complete all of the steps for the Portrait Collage assignment.</td>
<td>17:58</td>
</tr>
<tr>
<td>Resetting Photoshop</td>
<td>How to reset Photoshop to the default settings when first opening.</td>
<td>0:47</td>
</tr>
<tr>
<td>Selection Tools – Lasso Tool</td>
<td>How to utilize the Lasso tool to edit and select parts of an image.</td>
<td>5:01</td>
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<tr>
<td>Selection Tools – Magnetic Lasso</td>
<td>How to utilize the Magnetic Lasso to edit and select parts of an image.</td>
<td>5:22</td>
</tr>
<tr>
<td>Selection Tools – Quick Selection Tool</td>
<td>How to utilize the Quick Selection tool to edit and select parts of an image.</td>
<td>4:11</td>
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</table>
**Production Notes**

Throughout the duration of the study, the teacher worked to develop the screencast production process. Not only were there instances of challenges that came about, but also as with other studies there was an evolution of the process as a whole.

As the students were accessing the screencasts, there were several occasions throughout the study where the online learning management system, SchoolSpace, was not accessible directly or the Internet in the classroom was not working. The unexplainable down time resulted in frustrations for both the teacher and the students. One time when this had occurred, there were several students that had been absent the previous class due to a student-class meeting. When they had missed instruction, not only did they lose valuable time to work on the class assignment, they also were not present when the teacher had given a demonstration that made use of tools in Photoshop. The teacher had planned on continuing to work with other students that had already began utilizing the skills demonstrated the previous day, while those students who were absent would be able to make use of the screencasts that were published the evening before. Since SchoolSpace was not working, the teacher needed to conduct the same demonstration from the previous day. This resulted in the frustration of the teacher and students, as those who had already viewed the demonstration could not seek the assistance of the teacher. The teacher needed to spend time trying to get the absent students current, instead of spending the time working with the other students trying to further their progress on the assignment.
Another instance where the inability to access SchoolSpace proved frustrating was on a
day when the teacher had planned to use a screencast to supplement instruction. The
teacher believed that too many times when there is a substitute, particularly for the
Imaging Technology course, it is difficult to advance through the curriculum because the
substitutes are unable to teach the content or skills. The teacher prepared the screencast,
“Selection Tools – Lasso Tool”, the evening before to be used during the classes on the
day there would be a substitute. During the earlier part of that day the Internet was not
working correctly at the school and the plans left for the substitute that were to utilize the
screencast were invalid. Instead of attempting to maximize all class time, regardless of
whether or not the teacher was in the classroom, each class period that day had been
wasted, as the screencasts could not be utilized. In future planning for substitutes, the
teacher has made an effort to not cover new material while absent, but instead to make
sure the students have already received the demonstration so they can work on previously
assigned activities and assignments.

The evolution of the screencast process shifted dramatically over time from the first
screencast that was created. The first screencast, “Portrait Collage”, was a screencast that
was aimed at a particular group of students. In several sections of the Imaging
Technology course, the scheduling that was done had placed several advance level
students in the introductory-level class rather than in a separate advanced-level class all
together. The goal of the “Portrait Collage” screencast was to provide those advanced
students a complicated assignment that would teach them new techniques and processes
in Photoshop, while the teacher could simultaneously work with the other students on
more basic tasks and processes. The screencast covered the entire project from start to finish, and was quite lengthy with a time of seventeen minutes and fifty-eight seconds.

Though the advance students were able to complete the project with minimal assistance from the teacher, there were many challenges with creating a lengthy screencast. From the teacher’s perspective, it was difficult to create such a large screencast. Editing large amounts of the captured video proved to be quite time consuming, and there were several instances where the software stopped responding. It was found to be more effective to work in smaller segments and to try to produce mini-screencasts on a larger topic and break the content up. This made it easier for the teacher to work with, but also made it easier for the students to digest the content. The observation was made that students seemed to have a limited ability to remain focused and that they needed engagement throughout the screencast. Breaking up these larger screencasts into mini-screencasts allowed for the student to watch a procedure, then repeat the process with their own work, then watch another screencast and continue to repeat the process. This helped to ensure the students remained actively engaged throughout the viewing of the different screencasts that were published. Most of the screencasts that were created following “Portrait Collage” were developed to be more compact in nature and targeted the five minute duration or less when possible.

In addition to adjusting the screencasts from almost eighteen minutes to five minutes or less as the process evolved, the teacher’s proficiency in utilizing the ScreenFlow software to edit the screencasts improved. After creating multiple screencasts, it became easier and
faster to edit the content and make use of the different features that ScreenFlow offered. Making use of cursor call-out and zooming in on particular regions of the software allowed the teacher to focus attention in certain areas. The addition of text overlays along with recorded narration helped to draw emphasis on key concepts during the demonstration. Another addition that was considered by the teacher at the request of the students was to include some sort of music in the background of the screencasts. However, when considering music, it raised the issue of copyright legalities. To skirt this issue, the teacher would need to create or acquire royalty-free music to use in the videos and this was viewed as an increasingly cumbersome task to undertake and who believed that it would not yield benefits to the teacher or students in the long-term. Another issue with this consideration was the increased noise pollution it would generate in the classroom for those students that did not have headphones for viewing the screencasts and would need to use the built-in speakers.

**Implementing Screencasts in the Classroom**

In completing the study and creating numerous screencasts that were implemented in the Imaging Technology classes, several conclusions and recommendations can be made based on this study. There were numerous benefits to making use of these screencasts and while they proved to be effective in many ways, there are also instances were things just did not work as intended and certain changes could be made for future implementation.

*Effectiveness*
Overall, it was found that the implementation of screencasts in the Imaging Technology classes proved to be quite effective. An initial benefit to the teacher was that they were able to spend more time “working the room” on the days where the screencasts could be used. On these days, the teacher was able to focus more on assisting the students with making use of the skills demonstrated in the screencasts. Students were assisted by the teacher to utilize the skills demonstrated on their own images and projects rather than just what was covered on the sample image in the screencast. This created an opportunity for individualized instruction, as the teacher was able to help foster students’ creativity and advance him or her in their own particular way with the assignment they were working on. This one-to-one time increase helped to allow the teacher to guide the students to newer and higher-level learning, as they would be able to experiment with the skills demonstrated.

Though the study was focused on the efficacy of creating the screencasts from a teacher’s viewpoint, there was also the desired outcome of meeting the needs of the different learning modalities of the students. On one particular occasion where the screencasts were used to demonstrate the different selection tools available in Photoshop, a student identified how much easier it was for them to understand the concept because of the screencast. The student explained to the teacher how difficult it was for them to see how the tool could be used during a live demonstration, and that being able to pause and repeat the lesson on the screencast allowed them to just “get it”. Situations like this help to support the overall effectiveness of making use of these screencasts in the classroom.
Additional evidence to support the effectiveness of these screencasts was the observation made of students that were absent on days when in-class demonstrations were being conducted. On occasions where a screencast was available the next day, these students who were absent would be seen independently accessing the screencast to catch-up on the demonstration that they had previously missed. This helped to free the time of the teacher to work with other students, but also provided an independent learning opportunity to the student. It appeared that students would not only benefit by accessing missed content and demonstrations by viewing the screencast, but also it seemed that students were learning to make use of the resources available to them to help them learn. This unintended outcome was beneficial, as students were also seen seeking out other Photoshop related tutorials and processes that the Internet had to offer.

**What worked?**

While the utilizing the screencasts worked as a whole, there are certain points that should be identified that helped to make this endeavor successful. The most crucial part to the success of the screencasts would be found in the planning. The time spent on planning and outlining out what the screencast would cover helped to keep the screencast concise and directly to the point. The planning helped to make sure that all relevant aspects of the demonstration being conducted live in the classroom would also be included in the screencast itself. This helped to ensure the same level of instruction would occur in both places, so that students would receive the same content for both.
The software used to create the screencasts themselves, ScreenFlow, also work very well throughout this study. The simplicity of the software proved effective in creating the screencasts and also was able to easily adapt different aspects and features of the software. For example, making use of different call-outs to reinforce what was being stated in the narration was effective, along with zooming into different areas of the screen where certain parts of the demonstration were occurring. Not only was it easy to implement the features, but they also worked to help draw and maintain the attention of students at key parts of the screencast.

**Suggestions for Improvements**

In studying the efficacy of screencasting in the classroom, there were many successes found in reflecting on this particular study. However, in reflecting on the process, there would be several areas were suggestions could be made for improving on the process.

Though the ability to control and impact when the Internet is available and working is out of control of the teacher, one suggestion of improvement could be finding a different location to store the screencasts for student access. The several instances where SchoolSpace was not accessible proved to be challenging at times for both the teacher and students. Other considerations may be to make use of a third party solution outside of the school division. Constructing a class website could be a likely option, where the teacher could embed the screencasts from a video sharing website such as Vimeo. It is likely that a commercial third party option such as this would offer more stable and reliable access, but also make things easier to organize. The process of managing
multiple classes in the online learning management system proved to be cumbersome at time with having to maintain multiple classes. With this website, all students could link to it and the content could be organized by specific topics for anyone to view as needed.

As the study progressed and screencasts were being implemented in the classroom, students were regularly asking if there was a screencast available on something that they were just shown. The screencasts were being built to meet the needs of larger concepts and processes. In considering the requests for even more screencasts, another suggestion for future development would be to build a library of multiple segmented topics. When the different selection tools featured were broken down into the mini-screencasts, it allowed student to specifically seek out assistance on a particular tool they wanted to make use of. Other similar topics could include mini-screencasts on lighting or color adjustments. Each of those topics could be broken down into several different ways in accomplishing the task, just as was done with the selection tools.
References


