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Development of a System of Best Practices to Implement Flip classroom and Lecture Capture Methodologies - A Success Story

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In the past, Dr. Villiers worked on several projects sponsored by various agencies including the Florida Department of Transportation, Federal Highway Administration, and University Transportation Research Center Region-II. Some of his most recently completed and on-going work include the use of driving simulator to investigate patterns of drivers' behavior during various rainfall event using different roadway geometries. Deliverables from this project may help Florida Department of Transportation and other agencies with future decision making, such as variable message signs, determining appropriate corrective measures on existing roadway sections, and/or designing future roadway sections to reduce hydroplaning. He is a Co-PI for the grant submitted to NSF to allow Florida Gulf Coast University (FGCU) be a member of the Florida – Georgia Louis Stokes Alliance for Minority Participation (FGLSAMP). This program is committed to substantially increasing the number of degrees awarded to underrepresented populations within STEM areas. Last year, Dr. Villiers in collaboration with the Director of the Office of Community Outreach Programs, Associate Provost at FGCU along with the National Association for the Advancement of Colored People successfully initiated and completed a successful Pre-Collegiate Summer Camp to engage high school students from underrepresented groups in research and STEM activities. Dr. Villiers is also the founding faculty advisor for the American Society of Civil Engineers in WCOE at Florida Gulf Coast University.

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Development of a system of best practices to implement flip classroom and lecture capture methodologies – A Success Story

Abstract

Established in 1997, Florida Gulf Coast University (FGCU) is the second newest public university in the state of Florida. Each year, it attracts thousands of new freshmen because of its commitment to academic excellence combined with a younger regional population that is growing. Leveraging the use of technology in distance learning and teaching was part of the educational building blocks of Florida Gulf Coast University (FGCU). However, "flip classroom and lecture capture" technology were not implemented into any of the classrooms until the last three (3) years. In addition, the university did not have a structured system initiated across the campus. Faculty who used flip classroom or lecture capture systems, prepared their own implementation approach to deliver this e-learning technology in their classroom. While this technique is encouraging, it creates a stressful situation with the multiple demands by faculty in terms of different types of equipment and software used to implement flip classroom and lecture capture at Florida Gulf Coast University (FGCU). In addition, the department of Academic and Event Technology Services (AETS), who oversees technology in the classrooms, are overwhelmed to allocate adequate resources, quality staff members, and appropriate training necessary to implement this technology.

The objective of this work is to identify a system of best practices that can be used across disciplines and departments at Florida Gulf Coast University (FGCU) to implement flip classroom and lecture capture methodologies. This paper also presents an approach used to identify a cost effective system, implementation, delivery, and analysis of flip classroom and lecture capture used in two (2) Civil Engineering undergraduate courses (Civil Engineering Materials and Mechanics of Materials) at Florida Gulf Coast University (FGCU). Analysis was also conducted to assess the effectiveness of flip classroom and lecture capture instituted at Florida Gulf Coast University (FGCU) in the last two years. These objectives were meet by creating a pilot study. This study included the collaboration of the personnel of the AETS department and two faculty members in the Civil Engineering program at Florida Gulf Coast University (FGCU) and data from eighty (80) engineering students. The faculty surveyed the students in order to understand their perspective as well as the effectiveness of this new technique.

The program identified a cost effective system that utilized Adobe Connect and equipment to capture both pre-recorded and live lectures. It appears that this system is effective and can be used by faculty across the university. An analysis of the data obtained from the student's survey show that over 85% of students in these classes did watch at least one form of lecture capture

throughout the semester. 95% of the students believe that lecture capture should be expanded across the university. 80% of the students documented that lecture capture did advanced their understanding of the content in class by giving them the ability to review material that was covered in class. Faculty can used the lessons learned from this research at Florida Gulf Coast University (FGCU) at other institutions of similar size and makeup. It is recommended that these techniques should be refined to increase their acceptance among other disciplines and faculty across the university.

Introduction

Florida Gulf Coast University is a midsize University in Southwest's Florida. Established in 1997 with a focus on integrating technology into the education experience. Using technology as a pillar of the universities foundation requires constant innovation and research in all forms of technology, integration, and training. From its initial foundation, teaching has always been the number one priority along with integrating and leveraging technology to emphasize and multiply the efforts of the faculty, staff, and students of the University.

Conventional teaching pedagogy often incorporates faculty members interacting with students face-to-face in classrooms or lecture halls. This style of teaching is not always the most adequate for the newer generations of students that are much more adapt to digital interfaces, multimedia experiences, and information in smaller chunks of time [1]. "Lecture capture technology" and/or "Flipped Classroom model" can be defined as the multimedia devices used to record lectures for students to view asynchronously or synchronously through the use of screen capture equipment, microphones, and video cameras [2].

There are many different types of equipment that can be used to develop a lecture capture system. Every university must define their own criteria and constraints before establishing a lecture capture system. Institutions may purchase a turnkey solutions for lecture capture technology or develop their own in-house solutions. In this paper the authors identify a system of best practices that can be used across disciplines and departments at Florida Gulf Coast University (FGCU) to implement flip classroom and lecture capture methodologies. This paper also presents an approach used to identify a cost effective system, implementation, delivery, and analysis of flip classroom and lecture capture used in two Civil Engineering undergraduate courses (Mechanics of Materials and Civil Engineering Materials) at Florida Gulf Coast University (FGCU). The Academic and Event Technology Services (AETS) Department at Florida Gulf Coast University worked with faculty members to identify the criteria that they would want in their lecture capture solution. The AETS team broke down the needs of the University into the following minimum requirements of the lecture capture system:

- Camera with the ability to focus on different areas of the room
- Microphones with the ability to record the students and faculty members in the room
- Capture of the computer screen
- Capture of document camera
- Storage for the recorded media
- Web application to serve the media
- Control system to operate all the components
- Ease of Use
- Support teams ability to maintain the equipment

The effectiveness of this system was evaluated based on a student survey () conducted at the end of the two courses used in this study. The survey structured so that students can evaluate the quality of the deliverables including sound and video selected for this new technique, assessing the student learning, and rate the teacher's performance based on the new technique.

Objective

The purpose of this study was to establish the following:

- Identify a system of best practices that can used to implement flip classroom and lecture capture methodologies across disciplines and departments at Florida Gulf Coast University (FGCU).
- Develop an approach used to identify a cost effective system, implementation, delivery, and analysis of flip classroom and lecture capture used in two (2) Civil Engineering undergraduate courses (Civil Engineering Materials and Mechanics of Materials) at Florida Gulf Coast University (FGCU).
- Assess the effectiveness of flip classroom and lecture capture instituted at Florida Gulf Coast University (FGCU) in the last two years.

Scope and Approach

Florida Gulf Coast University, just like make many other universities, has looked for innovative ways to integrate technology into their teaching curriculum. This paper mainly focuses on the identification and implementation of flip classroom and lecture capture methodologies into the FGCU educational building block. To meet this objective, the office of Academic and Event Technology Services (AETS) spent extensive amount of time and resources to identify a cost effective and user-friendly system that can be used across disciplines and departments at FGCU. This task evolved from the literature of best practice to select the appropriate software, equipment, and resources that are most appropriate for the FGCU environment. A pilot study was designed using faculty from College of Engineering, College of Arts and Sciences, and College of Health Professions and Social Work at Florida Gulf Coast University; however, due to the availability of the data, only the courses from the College of Engineering will be used on

this work. To evaluate the effectiveness of this new system, surveys were administrated in two (2) consecutive years in Civil Engineering Materials and Mechanics of Materials courses. The faculty used student's feedback in or der to improve the system

Pilot Study

The faculty selected for the "Lecture Capture methodology" and/or "Flipped Classroom model" pilot study were from the College of Engineering, College of Health Professions and Social Work, and College of Arts of Science. The Director of Academic & Event Technology, Ms. O'Connor-Benson initiated and led this effort. The Arts and Science faculty include a Mathematic instructor who taught Calculus to undergraduate students on a regular basis. The College of Health Professions and Social Work taught two classes that involved this new technology. The Social Work course was taught in two sections, an undergraduate level face-to-face format and a graduate level completely online format. This instructor used a unique interactive option by inviting the students in the online graduate section to participate in the discussions with the undergraduate level students. The graduate students joined the "live (on campus)" section and had full access to communicate and see the class. This instructor also invited guests from different locations who joined the class using the internet to participate. Two (2) faculty from the College of Engineering utilized this technology in this pilot study. One in Civil Engineering who utilized his Civil Engineering Materials class for this pilot study and the author faculty who co-taught (along with the previous faculty) Mechanics of Materials. Since only survey data for the Engineering courses are available at this time, only these two classes will be used to document the effectiveness of "Lecture Capture methodology" and/or "Flipped Classroom model" at FGCU in this paper. Work is in progress for a more comprehensive evaluation using all the classes that used this new technology.

Logic behind Course Selections

Dr. Villiers was among the four (4) FGCU faculty selected in this pilot study. He focused on utilizing "Lecture Capture methodology" and/or "Flipped Classroom model" to make teaching and learning more effective to students in the Civil Engineering Class. This class was selected as part of the pilot study because Dr. Villiers (one of the authors on this paper) has looked for ways to improve the delivery of class materials to the students. In addition, the instructor used both the concept of flip-classroom and lecture capture in his classes. The overall Student Assessment of Instructor (SAI) rating ranged an average of 3.2/5.0. This value of SAI is the lowest that Dr. Villiers has received as compared the other courses that he taught at FGCU. Also, the students have reported in previous class surveys that they struggled with the large amount of materials required for this course. They have reported this is the first engineering course that they have taken with a vast majority of new materials and concepts.

Traditionally, at the beginning of each module the instructor started with PowerPoint presentations to explain the terminology and concepts involved in the particular module. It would

be easy to say after a brief introduction lets challenge the students to read the materials on their own. While this approach may work at some institutions, at FGCU the vast majority of students do not have the proper background to use this model. It usually takes one to two full lectures to explain the module. This leaves the instructor another three to four lectures for in-class activities with problems solving, labs, and review for tests. The instructor and students felt the pressure of covering a lot in a short period.

With the implementation of "lecture capture methodology" and/or "flipped classroom model" into this CE Materials class, the instructor made significant improvement to the delivery of the material to the students. At the beginning of each chapter/module, the instructor pre-recorded lectures and posted them on the university's learning management system, CANVAS (i.e. "flipped classroom style"). The students can view the videos on their own time from on or off campus. This allows the students to familiarize themselves with the materials and concepts before the instructor discuss them in class. For the CE Materials course, the students used the pre-recordings to learn about the lab procedures prior to doing the laboratory exercises. In addition, this approach allowed the instructor to devote more class time for problems solving and in-class activities which have been recommended by students from previous course assessments.

During class time, the instructor also recorded "live" lectures (i.e. "lecture capture") and posted them on CANVAS shortly after each session. The students have the flexibility to watch videos at any time and at their own pace. This technique believed to be effective in improving students' learning. The instructor conducted surveys throughout the semester to evaluate the students' perspective of this new technology.

Mechanics of Materials selected for very similar purpose as CE Materials. Mechanics of Materials is offered every semester (Fall, Spring, and Summer) at FGCU. A sophomore level class is required for all Civil Engineering majors at FGCU. Dr. Villiers and Dr. Nguyen co-taught this class in the summer of 2015. It was a perfect opportunity to capture the perspective of the students who enrolled in that class for Lecture Capture. In addition, it provided the opportunity to promote this technology to other faculty in the program.

Course Structure and Outline

Dr. Villiers is well experienced in teaching this course. He has been teaching Civil Engineering (CE) Materials class since the debut of the program in 2006. He also taught this course at other institutions including The City College of New York. At Florida Gulf Coast University, this course offered to junior level students every fall semester. The average class size is 65 students and is usually broken down into two separate sections. The primary goal is to engage students in a classroom setting by teaching the theory behind the structure, properties, and/or material characteristics pertinent to each subject. Dr. Villiers stresses the practical applications from real-world examples, and when applicable, provides hands-on applications and field trips that the students can easily appreciate. By doing so, Dr. Villiers creates a direct connection between students and the subject matter.

Homework assigned periodically and weighted 5%. The students have to write four (4) major laboratory reports (one for each module including aggregate, concrete, hot mix asphalt, and steel). They were worth 20% of the final grade. The students took three (3) tests for 50% of their grade in the class. The faculty administered a cumulative final that counted for fifteen percent of the total grade. Similar to the CE Materials, both Dr. Nguyen and Dr. Villiers are well experienced in teaching Mechanics of Materials. During the summer, this class is taught at a very fast pace. In about nine (9) weeks (compared to fifteen (15) weeks in the regular semester), the faculty has to disseminate the entire course materials to the students. In addition, this class include three (3) lab reports and a term project. The students are under the same pressure to assimilate a lot of materials in a very short period of time. It was a perfect fit to select this class for this study. It also allowed the students to have the flexibility to watch recorded videos from live class session to improve the understanding of concepts and materials covered in the class.

The grading in this Mechanics of Materials course is based on the following percentages, with points used as weights in determining the relative importance of each topic and subtopic.

- Homework …….10%
- Design Project ……..... 5%
- Lab Reports ……15%
- Exam 1 ……... 20%
- Exam 2 ……... 20%
- Final Exam ……. 30%

Analysis and Results

Identification of Best Practice of Lecture Capture

The first objective of this paper is to identify a system of best practices that can be used across disciplines and departments at Florida Gulf Coast University (FGCU) to implement flip classroom and lecture capture methodologies. A series of request from faculty members to record

the document camera in classrooms was the entry point for the AETS department to start identifying lecture capture technology and its effects in the classroom. The Director of Academic & Event Technology, Ms. O'Connor-Benson appointed a team to determine the cost and feasibility of purchasing a lecture capture system that would work across all departments of the university. This team worked for over two years (prior the pilot study) researching and identifying the criteria of the system from the following perspectives:

- Faculty perspective of operation
- Student perspective of use
- Administration perspective of cost
- Support perspective of maintenance and upkeep

Each perspective was taken into account when researching and comparing different turnkey solutions. Identifying the needs of each stockholder allowed the team to compare each product on the features that those perspectives valued, opposed to just comparing one product to the other. This team reached out to other institutions in the state and other institutions of similar size out of the state to understand how their systems were select, implemented, and cost.

Equipment and Software Selection

Developing this new technology at Florida Gulf Coast University or any other institution requires a partnership between the support departments that maintain and integrate the technology and the users of the equipment. One of the objectives of this paper was to identify a cost effective system, implementation, delivery, and analysis of flip classroom / lecture capture technology. The department of Academic and Event Technology Services (AETS) looked at many turnkey solutions and found that the start-up and maintenance fees were cost prohibitive. This led to the development of an in-house solution that would integrate the existing control system that are in all the classrooms and existing webinar software that many of the faculty members have be using. This decision to integrate technology that the faculty is familiar with helped decrease the learning curve for using the lecture capture systems in the classrooms. The more accustomed faculty members are with the components of a new system, the lower the barriers are that would prevent them from using the technology. Kopcha[3] found that teachers often report the lack of time, resources, and training as a leading cause of new classroom technology not g implemented in their own teaching styles [3]. The use of an in-house solution allows for greater degree of customization and flexibility that was not found by other turnkey solutions that would specifically address the issues of time, resources, and training. The same manufacturer that was already being used in other rooms on the campus made the cameras that were used in the implementation of the lecture capture system. The repeated use of similar technology makes it easier for the support staff to maintain the equipment in the rooms by limiting the different types of equipment manufacturers that are in use. The camera selected met the criteria of being able to pan, tilt, zoom, and auto track the subject without the use of a collar or IR emitter. Figure 1 is a picture of the system that selected to deliver Lecture Capture on this system.

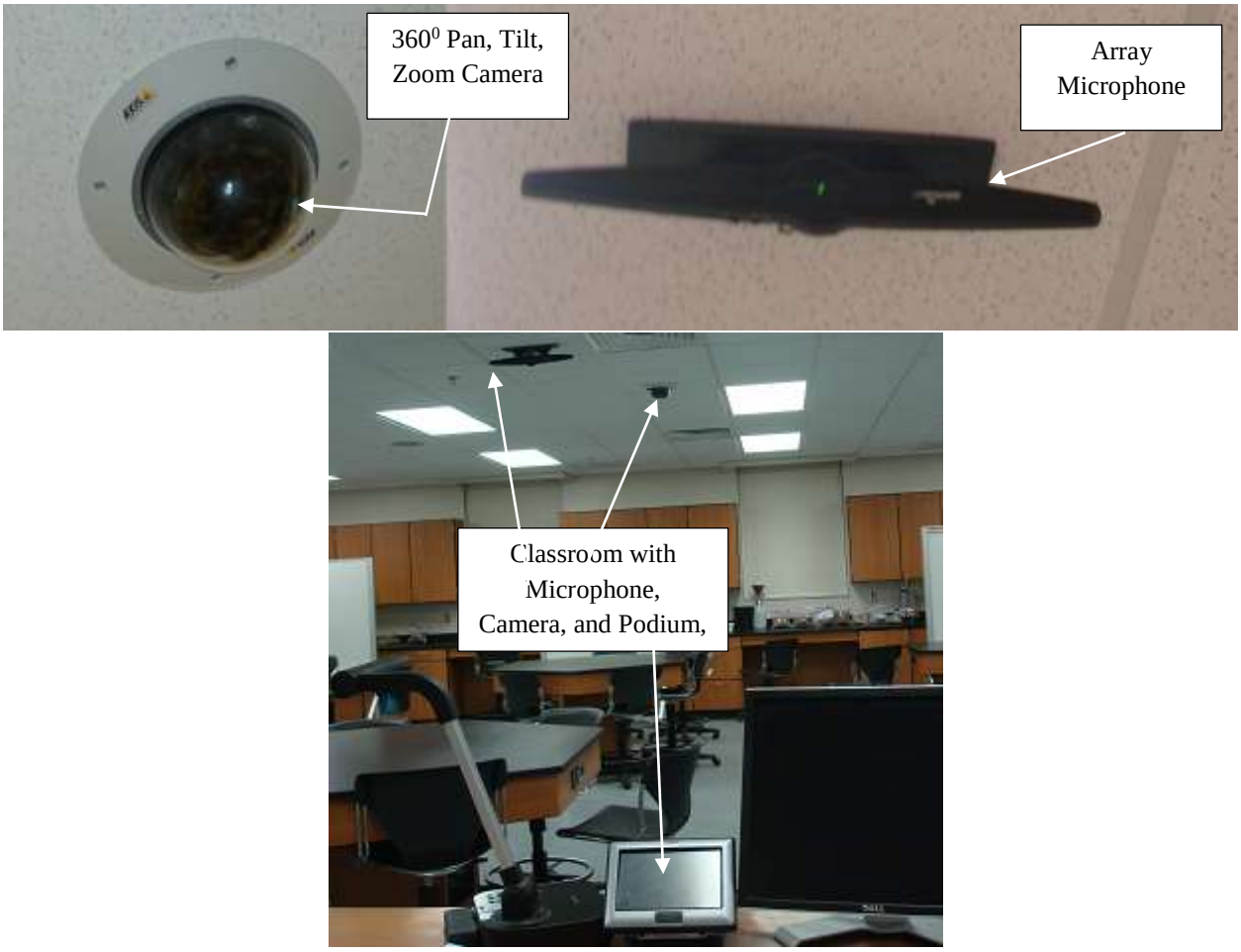

Figure 1. Lecture Capture on this system Used in this Study.

AETS looked at many different types of microphones that can be used in a classroom and found that connecting an array microphone and a wireless lavaliere / wireless handheld microphone would allow faculty members to have the freedom to choose between a single voice and audio from the entire room or to have both at the same time (see Figure 1).

The final component that implemented on the technology side of the lecture capture system was the integration of Adobe connect. Adobe connect is a webinar software that was already being used by many of the faculty members on the campus. This software meets the criteria of synchronous and asynchronous delivery of the class content and provides storage and bandwidth for the recordings.

Support Team and Resources

The development of a lecture capture system requires support teams working hand-in-hand with faculty members and administration to develop a system that can meet the needs of the stakeholders of the university. The physical implementation of a lecture capture system is only

part of the equation when you are developing a system of best practices of lecture capture methodologies.

The second part of developing this system is to integrate the training of the faculty members that are using the system. It is critical to the adoption of new technology that the users feel comfortable and in control[3]. Developing a pilot study allows for faculty members to work with the technology and provide feedback on how the technology can be changed to maximize its effect on the student learning outcomes. AETS identified three faculty members to help develop the lecture capture system for synchronous, asynchronous, and flip classroom delivery. These faculty members help expand the lecture capture program by providing insights and experiences to other faculty members. Participating in demos and roundtable discussions of lecture capture helps to increase the user base and acceptance of lecture capture technology on campus. The development of mentoring and professional learning communities greatly increases the acceptance of new technology and faculty members' ability to integrate that technology into their own classroom[4].

Assessment (Survey Results) of the Lecture Capture

At the end of the semester, a survey conducted to determine the student perspective on the Lecture Capture methodology. Lecture Capture and/or Flip classroom used for two (2) consecutive years for the CE materials Course. Data obtained from eighty (80) engineering students. One semester survey was available for the Mechanics of materials and two (2) semesters for Civil Engineering Materials. The survey is designed to determine the effectiveness of this technology, assess the student learning, and rank the instructor performance level. A copy of the survey provided in Appendix 1. The results from the survey will be used to make inferences.

System Selection and Quality at Florida Gulf Coast University

In the Lecture Capture pilot study Ms. Florida Gulf Coast University used questions 6, 7, and 8 in order to assess the quality of sounds and videos. The survey results related to this section are presented in Figure 2. In 2014, the CE Materials class was the first class used to test this new experiment. Both the faculty and AETS did not know how new to the system would operate in a production environment. Seventy-two percent (72%) of the students reported (strongly agree or agree) that the sound and video quality of the lecture recordings was good. At the same time twenty eight percent (28%) disagree or strongly disagreed and felt that the sound and videos quality were poor. In the comments section, some students reported "*Great idea. Unfortunately, I have even a harder time understanding the professor. Maybe the professor should wear a microphone or add subtitles*".

It was a priority for the team to find solutions to improve these concerns. Several steps were taken to remedy the situation. These steps included:

- Identifying if the video issues where inherent to the system
- Confirm if the items that were causing the low quality were defective or if an alternative devices would have to implemented
- Diagnose if faculty members can increase the quality by changing to activities that are more suited for recording.

Similarly, the students were not pleased with the voice quality when they have to follow all parts of the classroom discussion on the lecture recordings, including student questions. In 2014, only fifty eight percent (58%) of them strongly agree or agree that they could follow the class discussion in the CE Materials. Many of them commented that the voice of the students were too low when they played back the videos. The students commented: "*Better camera focus; follows subject accurately. Better sound quality".* One of the immediate tasks that was implemented in 2015 was to have the instructor repeat the questions of the students. In addition, the instructor recommended each student to speak louder when asked questions or provided discussions in class. The team continually tries to identify new tools and equipment to improve these concerns. They have implemented changes in many different aspects to address each of these concerns. Some of the important lessons that learned through experimentation is the physical placement of microphones can greatly change the quality of the audio. The movement of the ceiling mounted array microphone and a change in the type of line level mixer greatly improved the quality of the audio. Each of the engineering classrooms has equipment that produces sounds that being picked on the microphone and producing background noises. These noises where fixed by slightly moving the microphone and adjusting the level properties until and best outcome achieved. Development of any system requires continually improvement and lecture capture is no different.

The hard work paid off and in 2015, these two concerns improved significantly. In 2015, the students who reported (strongly agree or agree) that the sound and videos quality of the lecture recordings was good jumped to eighty six percent (86%). This is a thirteen percent (13%)

improvement (see Figure 2). Similarly, a fourteen percent (14%) drop observed from 2014 to 2015 for the students who reported that the sound and video quality did not meet their expectation. In terms of the class discussions and questions asked by students, a big improvement observed as well. In 2016, eighty nine percent (89%) (a jump from 58%) strongly agreed or agreed that they could follow other student discussions when the video were replayed. While the team is very pleased with these numbers, the continued improvement is encouraged.

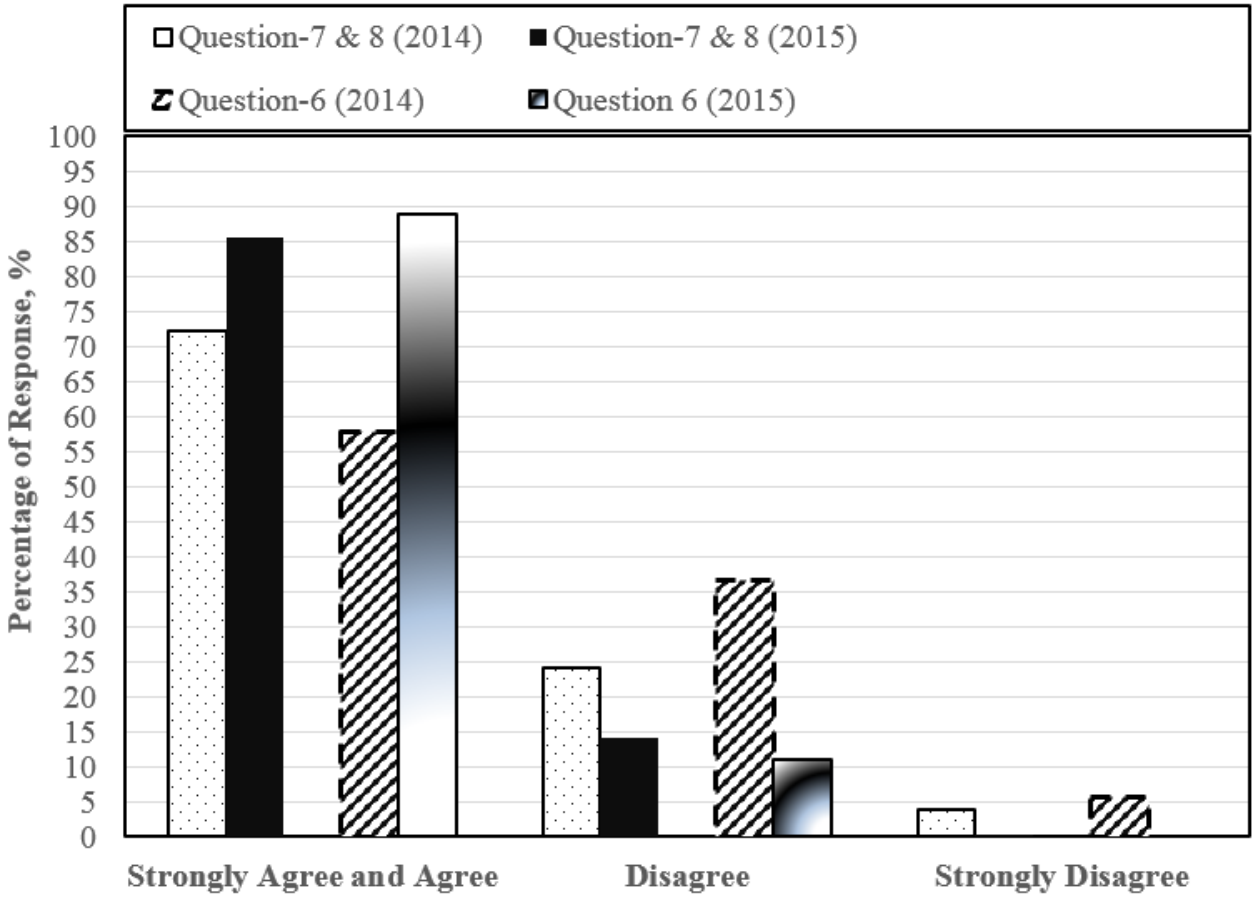

Figure 2. Best Practice - Future of Lecture Capture[i]

Effectiveness of Lecture Capture at Florida Gulf Coast University

Another objective of this work was to assess the effectiveness of flip classroom and lecture capture technology at Florida Gulf Coast University (FGCU). Questions 1, 2, and 5 selected from the student surveys from both the Civil Engineering and Mechanics of Materials class to make inferences about this goal. The results presented in Figure 3 and a copy of the full survey presented in Appendix 1. A website address provided to all the students in the courses to access the recorded videos. From an instructor perspective, the system is easy to learn. Many of the

[i] Q7 – The sound quality of the lecture recordings was good; Q8 – The video quality of the lecture recordings was good. Q6 – I could follow all parts of the classroom discussion on the lecture recordings, including student questions.

faculty who used the new technique had no prior experience dealing with Adobe Connect and no familiarity manipulating the camera and video. With two (2) to three (3) training sessions, most if not all were able to perform all the tasks including setting up the system, adjust the microphones and camera, record the sessions, and providing a link for students' to access the recording. One student wrote in the comment section that *Dr. Villiers did an excellent job with administering a new system".*

Ninety four percent (94%) of the students reported that the Lecture Capture recordings were easily accessible (Question 5). This is evidence that the system selected was reliable and useable for the students. Similar percent of students also confirmed that the new system reinforced the course materials (question 1). Contrarily to popular believe, students did not skip class given they can watch the videos at different time. Class attendance that was monitoring on regular basis proves that students attended classes 85% of the time. This is a typical value observed prior to Lecture Capture technology implemented in the class. The students viewing activities were observed greatly increase two (2) to three (3) prior to test time. In fact, eighty-nine (89%) strongly agreed or agreed that the new system assisted them in preparation of homework and exams (Question 2). A student wrote in the comment section that: "I *felt like the videos were needed to understand the concepts talked in class because they were not explained as well as they could be during lecture. However if the videos are watched before class it was a great tool". Another one added that "I viewed the recorded lectures in preparation to study for exams".*

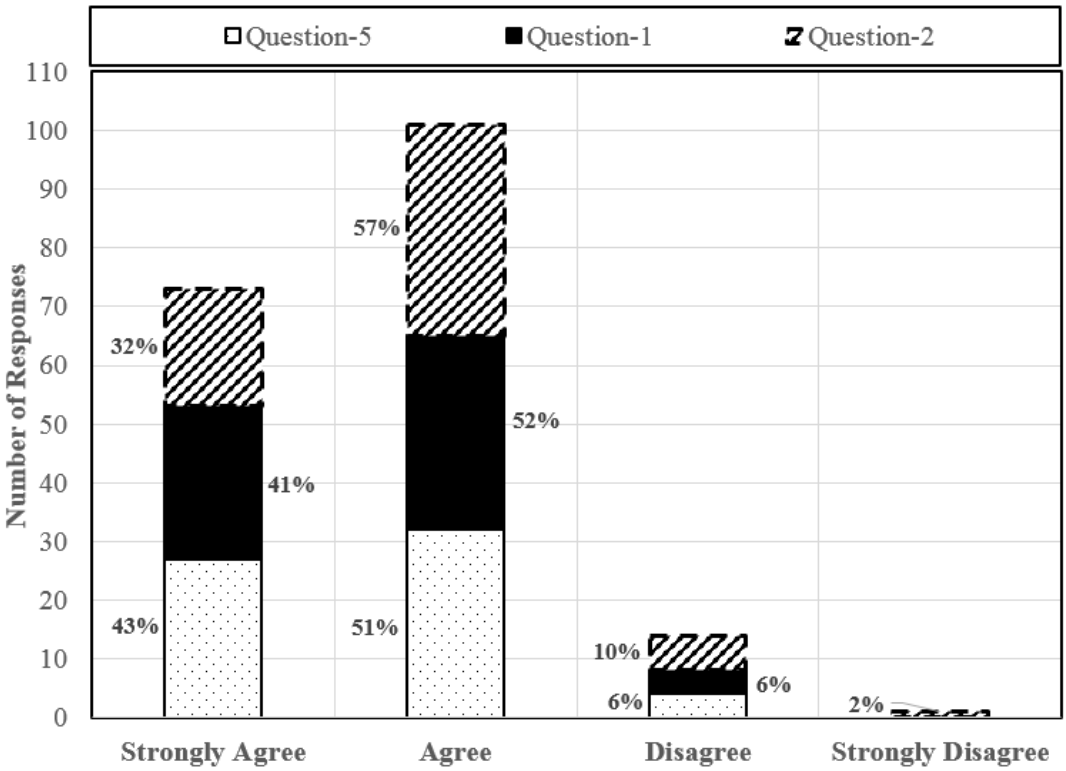

Figure 3. ***Student is Learning and Future of Lecture Capture at Florida Gulf Coast University***[ii]

In the essence of testing the Lecture Capture and its relationship to student's learning, two questions were isolated to obtain the student's perspective. When asked if the recordings clarified concepts discussed in class (Question 4), Eighty nine percent (89%) of the students strongly agreed or agreed that Lecture Capture help them reached that level of intellect (See Figure 4). Recall, CE Materials class was one of Dr. Villiers' class in which the students struggled to assimilate the vast majority of information presented in class. It appears that Lecture Capture helped the students reached a level of learning that they are comfortable with by reviewing the recorded videos. However, seventy six percent (76%) of the students reported that they strongly agreed or agreed that they learned more in class using the lecture capture recordings than if the recordings had not been available (Question 9). It appears that these results are in line with the other survey answers and comments. Then next questions examine the level of support that students have toward expanding this new technology to other courses throughout the university (Question 10). Ninety five percent (95%) responded that they would like to see Lecture Capture expanded (see Figure 4). In the comment section, some students reported "*More instructors need to record their lectures".*

[ii] Q 5 – I could easily access and download the lecture recordings. Q 1 – Lecture recordings provided a convenient way to reinforce course materials. Q 2 – Lecture recordings assisted me in preparing for homework and exams.

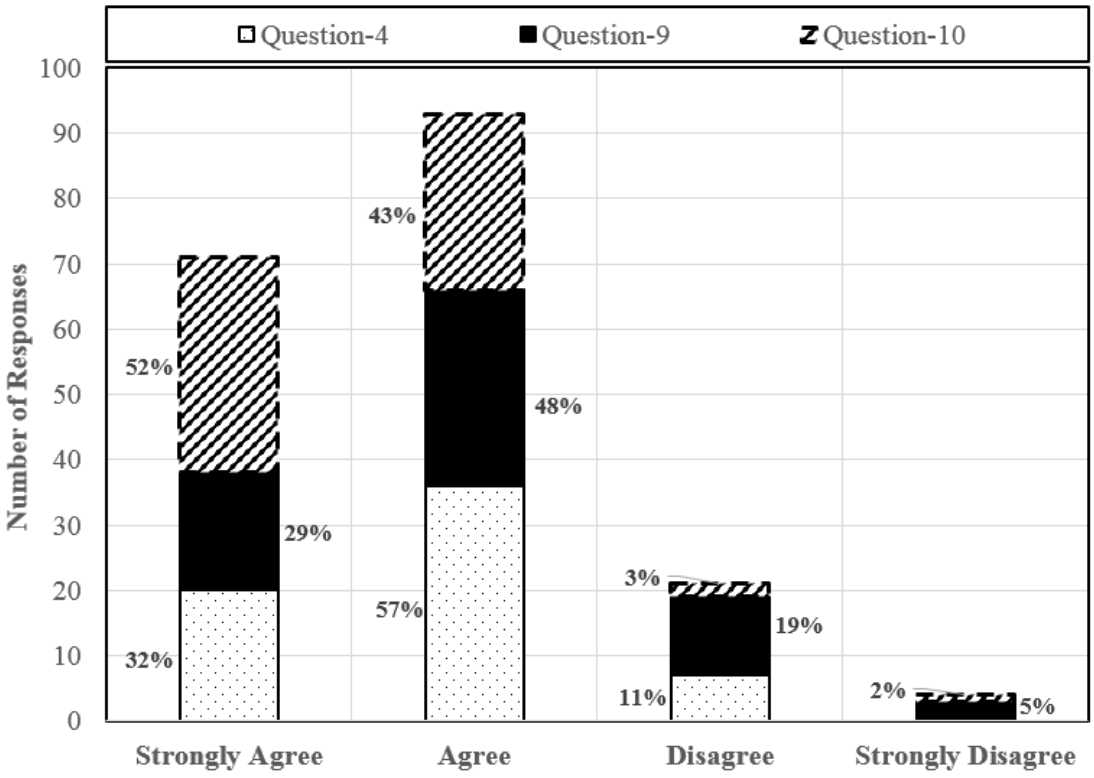

Figure 4. Student is learning - Future of Lecture Capture[iii]

Conclusion and Recommendations

The main objective of this work was to identify and implement flip classroom and lecture capture methodologies into FGCU education curriculum. The department of Academic and Event Technology Services (AETS) worked closely with various faculty members to meet the goals of this paper. Based on the data availability, this paper focuses primarily on the lecture capture experience within the civil engineering undergraduate courses Civil Engineering Materials and Mechanics of Materials for two (2) consecutive years. A cost effective and user-friendly system was developed. This system utilized Adobe Connect and equipment to capture both pre-recorded and live lectures. It appears this system is effective and faculty across the university can use it.

[iii] Q 4 – Lecture recordings clarified concepts discussed in class; Q 9 – I learned more in class by using the lecture recordings than I would have if they had not been available; Q 10 – Did newly designed rubric helped you in preparing the lab reports?

Building support for lecture capture technology integration within the classrooms requires an understanding of how these types of technologies will impact student learning. There often two questions asked about the effects of lecture capture on a class by faculty members. The first question is why students would continue to come to classes if they are able to watch the lecture afterwards and the second question is the effect on student grades. The results of research conducted at many universities is similar to the results found at Florida Gulf Coast University that the effect of lecture capture on the attendance is minimal at best[1, 5, 6]. The uses of lecture capture technology as a positive impact on students who use the technology. They have reported in the survey that this teaching technique helped them significantly to review and have a better understanding of the materials that covered during live session.

The research at Florida Gulf Coast University also has found that students that have taken classes that use the lecture capture technology were recordings to be helpful in completing homework and studying for tests. These were some of the results that gathered some surveys that distributed to the students in those classes. Ninety five percent (95%) of students believe that lecture capture should be expanded across the University. 80% of the students documented that lecture capture did advanced their understanding of the content in class by giving them the ability to review the material that was covered in class.

Work in the progress to improve and refine the system that was developed from this pilot students. Last semester, the instructor integrated quizzes into the CE Materials course. Preliminary results showed that students spend quality time to time to view and understand the course materials from the pre-corded Lectures. They performed extremely well in the quizzes. This new system implemented in Transportation Engineering and Fundamental Engineering review courses. The department of Academic and Event Technology Services (AETS) has also conducted a series of trainings for Faculty at FGCU. They have partnered with FGCU Lucas Center to demonstrate the use of this new technology and explore ways to integrate this technology across campus. These training have been well received by faculty. They have been provided positive feedback and showed high interested in integrating this system into their teaching methodologies. As was reported in Eagle News “This new technology is going to enrich student learning more than anything else and the faculty experience in teaching. It really does nothing but expand the knowledge base. It only helps student learning increase, which is one of the missions of the university[7].”

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Appendix 1 – 2014

FGCU Capture - Civil Engineering Student Assessment

Please rate the following components as they relate to your Lecture Capture experience with this class:

	Strongly Agree	Agree	Disagree	Strongly Disagree
Lecture recordings provided a convenient way to reinforce course materials				
Lecture recordings assisted me in preparing for homework and exams				
I was able to use lecture recordings to help me catch up when I missed class				
Lecture recordings clarified concepts discussed in class				
I could easily access and download the lecture recordings				
I could follow all parts of the classroom discussion on the lecture recordings, including student questions				
The sound quality of the lecture recordings was good				
The video quality of the lecture recordings was good				
I learned more in class by using the lecture recordings than I would have if they had not been available				
I would like to be able to access recorded lectures in other classes offered at FGCU				

Comments? Suggestions?

Please let us know how/if we can make FGCU's lecture capture experience better!