USING iBOOK TECHNOLOGY IN PROFESSIONAL ATHLETIC TRAINING EDUCATIONAL PROGRAMS

A THESIS

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THESIS APPROVAL

Graduate Athletic Training Education

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INTRODUCTION

Technology in athletic training education has been a topic of research since the 1990s without a conclusion on its effectiveness. The 2014 ECAR Study of Undergraduate Students and Information Technology Report stated that out of the 99% of students who own internet-capable devices, 8% own just one device, 92% own at least two devices, and 59% own three or more devices, showing the popularity of these devices.[1] These mobile devices give people the ability to access information from almost anywhere using wireless internet connections and various apps[2] with research showing that using a device, such as an iPad, as a part of an educational course can contribute to learning and engagement in the course.[3] As the popularity of these devices increases so does the popularity of applications or "apps". Between Apple and Android devices and their associated app stores approximately 50 billion apps were downloaded in 2012 alone.[4,5]

Today's generation of students have grown up with constant access to various forms of technology and therefore have been described to be very confident, and

find it necessary to use technology in all aspects of life.[6] Having instant access to information and contact with other people leaves this generation of students looking for interactive, collaborative, and authentic learning opportunities.[6,7] Yet some instructors are finding mobile devices distracting to students and more often than not banning their use in classroom altogether.[1,8] However if professors have the knowledge of student's learning styles, especially for these Millennial Students, its advantageous as it allows them to design courses, integrating various modes of technology, to maximize benefits for students.[9]

Since Wiksten et al published their study in 1998, other research has been conducted without concrete results that an Interactive Athletic Training Education Curriculum method is, or is not, better than traditional lecture. Therefore, the purpose of this study is to attempt to fill in informational gaps by examining the use of a created iBook on an iPad in a professional Athletic Training General Medical course to determine if the students find this mode an effective and valuable learning tool. The combination of devices plus access to information via wireless internet, or wifi, creates a unique opportunity to change the way we teach.

METHODS

The primary purpose of this study was to investigate students' perceived value and satisfaction with iBook integration into their General Medical course. This section will include the following subsections: Research Design, Subjects, Instruments, Procedures, Hypotheses, and Data Analysis.

Research Design

This research primarily utilized a descriptive design. The dependent variables that were measured in this study were the reported measure of value and satisfaction. These measures were assessed before and after implementation.

Subjects

The subjects utilized for this study were volunteer students in spring of their second year of a professional phase of a CAATE accredited athletic training program. All subjects were enrolled in a General Medical Course, ATE

315. Subjects indicated consent to participate by completing the project surveys. The project was approved by the CalU Institutional Review Board prior to any contact with potential participants. (Appendix C1)

Preliminary Research/Project Development

A pre-survey (Appendix C2) and post-survey (Appendix C3) were used to measure the participant's perceived level of satisfaction and value with the iBook. These surveys were modified from previously completed unpublished research studies. Once completed the surveys were reviewed by a panel of experts before being distributed to the participants.

Instruments

The primary instruments were a pre-survey (Appendix C2) and post-survey (Appendix C3) that were modified from previous related research studies. The pre-survey was approximately 30 questions. Question content included demographic information, personal technology use, and information on how they think the iPad could be useful. The

final set of questions used a five point Likert scale to answer survey questions.

The post-survey was approximately 40 questions. Question content included demographic information, personal technology use, and questions evaluating their perceived value and satisfaction with the iBook in the General Medical course. These last questions were asked using a five point Likert scale.

Procedure

The first step was the development of the iBook content. The researcher was responsible for gathering material in order to develop the iBook. Materials included anatomy textbooks, narrated Power Point presentations, YouTube videos, and NATA position statements in order to develop a comprehensive and interactive iBook on pulmonary anatomy and physiology. All YouTube videos used in the iBook met the current National Athletic Trainers' Association (NATA) competencies. During this process the pre-survey and post-survey were developed based on previously used surveys in order to test the hypotheses. Once completed the surveys were reviewed by the committee to establish its validity.

One week prior to the start of the pulmonary unit in ATE 315, participants completed an in-class instructional session. Led by the primary researcher, instructions included how to sign out the iPads, instructing participants on how to access the iBook, content of the iBook, and what was expected from them during the study. During this time the pre-survey was distributed, completed by the participants, and collected. The participants were instructed to utilize the iBook during the week before the pulmonary unit was scheduled to be taught in the classroom. It was up to the individual how often they consulted the iBook before the unit began. The course instructor also encouraged participants to utilize the iBook. Once the unit began there were assignments and videos they were asked to view as part of the course. Participants had access to the iBook for the entirety of the pulmonary unit and were encouraged to look through the iBook as often as they felt was necessary. At the end of the unit, approximately one week from the beginning of the unit, the iPads were collected and the post-survey was administered, filled out, and then collected.

Hypotheses

The following hypotheses were based on previous research and the researcher's intuition based on a review of the literature.

1. The subjects will find increased value in the iBook and iPad.
2. The subjects will find increased satisfaction with the iBook and iPad.

Data Analysis

All data was analyzed by SPSS version 22.0 for windows at an alpha level of 0.05. Descriptive variables were calculated for all survey questions. A paired t-test was used to analyze the pre-survey and post-survey mean values for value and satisfaction questions.

RESULTS

As previously stated the primary the purpose of this study was to investigate students' perceived value and satisfaction with iBook integration into their General Medical course. This section contains the study's findings and is distributed among three subsections: Demographic Information, Hypothesis Testing, and Additional Findings.

Demographic Information

A total of 10 participants in the General Medical course at California University of Pennsylvania participated in this study. The iPads with the iBook were given to participants to utilize for a week before the start of the pulmonary unit, and during the week of the pulmonary unit. The participants were encouraged to utilize the iPads for purposes other than just the iBook. The subjects were 7 females and 3 males. The subject's average age was 21.2 y (+/- 3.12).

The subjects were asked a series of questions about their use of personal technology (iPhones, iPads, other

smartphones and tablets) and their comfort level using technology. The results are showed in Table 1.

Table 1: Comfort Level using Technology

Question	Mean	Std Deviation
Pre-Survey: How would you rate your comfort level with technology?	1.556	.7265
Post-Survey: How would you rate your comfort level with technology?	1.400	.6992

1= Very Comfortable; 2= Comfortable; 3=Uncomfortable; 4= Very Uncomfortable

In the post-survey subjects were asked how often they used the iBook. One question asked how many days a week they spent looking at the iBook in the last two weeks. Two subjects answered 0-1 days a week, seven subjects answered 2-3 days a week, and one subject answered they did not look at the iBook.

A second question from the post-survey asked subjects how many minutes per day they spent looking at the iBook in the last two weeks. Five subjects answered 0-30 minutes per day and four subjects answered 31-60 minutes per day. One subject did not answer this question. This was the subject who answered they did not look at the iBook in the previous question.

Hypothesis Testing

The following hypotheses were tested in this study. All hypotheses were tested with a level of significance set at $\alpha = 0.05$. A paired-sample t-test was conducted to compare the means and standard deviations for the pre-survey and post-survey questions for satisfaction and value.

Hypothesis 1: The subjects will find increased value in the iBook and iPad.

Conclusion: Subjects reported a pre-iPad experience (question 28) mean of 3.800 (sd=.6325) and a post-iPad experience (question 8) mean of 3.400 (sd=.2211) for the questions regarding value. The paired t-test concluded that there was no statistical significance between these means ($t(9)=1.177$, $p>.05$).

Hypothesis 2: The subjects will find increased satisfaction with the iBook and iPad.

Conclusion: Subjects reported a pre-iPad experience (question 27) mean of 4.000 (sd=.2108) and a post-iPad

experience (question 7) mean of 3.700 (sd=.3350) for the questions regarding satisfaction. The paired t-test concluded that there was no statistical significance between these means ($t(9)=.758$, $p>.05$).

Additional Findings

A series of questions were asked using a Likert Scale to determine how valuable the iBook was to the subjects during the pulmonary unit. Table 2 shows the average score for each of the survey questions regarding value.

Table 2: Value of iBook Statistics

Question	Mean	Std. Deviation
The use of the iBook to review pulmonary anatomy and physiology added VALUE to the course	3.700	.8233
The use of the iBook to review pulmonary exercise physiology added VALUE to the course	3.800	.9189
The use of the iBook to learn about pulmonary illnesses/disorders added VALUE to the course	3.600	.8433
The use of the iBook to view skills videos (using a meter-dose inhaler, nebulizer, and pulse oximeter) added VALUE in this course	4.000	1.5041

1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree

A series of questions were asked using a Likert Scale to determine subject's satisfaction with the iPad and iBook during the pulmonary unit. Table 3 shows the average score for each of the questions that inquired about the subject's satisfaction level.

Table 3: Satisfaction with iBook Statistics

Question	Mean	Std. Deviation
The use of the iBook to review pulmonary anatomy and physiology increased my SATISFACTION in this course	4.100	.7379
The use of the iBook to review pulmonary exercise physiology increased my SATISFACTION in this course	3.800	.9189
The use of the iBook to learn about pulmonary illnesses/disorders increased my SATISFACTION in this course	3.600	.6992
The use of the iBook to view skills videos (using a meter-dose inhaler, nebulizer, and pulse oximeter) increased my SATISFACTION in this course	4.000	1.0541
The use of the Internet during class via the iPad increased my SATISFACTION in this course	4.100	.9944

1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree

A series of general questions were asked using a Likert Scale to determine how subjects viewed the iBook and iPads during the pulmonary unit. Table 4 shows the average score and standard deviation for each general question asked in the post-survey.

Table 4: General Questions about iPads and iBook Statistics

Question	Mean	Std. Deviation
If given the opportunity to take a course utilizing the iPad or iBook again, I would choose to do so	4.100	.9944
I will perform better on the test due to utilization of the iBook in the course	4.300	.8498
I will consider using the iPad to add media (pictures, video, etc.) to future projects	4.100	1.1972
The iPad helped me develop technological skills that will help me in the future	3.600	1.0750
I think this course should continue using iPads and iBooks in the future	4.100	.9944
I think more athletic training/physical therapist assistant courses should utilize the iPad and iBooks during instruction	4.300	.8233
The value the iBook had in my learning as used in class exceeded my expectations	3.700	1.1595

1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree

Subjects were able to give feedback on the open ended questions at the end of the post-survey. Nine subjects gave feedback on the question on what they liked about the iPad. Three subjects answered they liked how "easy it was to access the internet and information." Others responded they liked how portable and lightweight the iPad was. One subject commented that they disliked the iPad, calling it a distraction. Eight subjects commented that the iBook had

good, organized information and they liked that it was located in one place. One subject commented that they disliked how the iBook was hard to figure out at first.

DISCUSSION

The purpose of this research was to examine the level of satisfaction and value of the iBook in the General Medical course. This section is distributed among three subsections: Discussion of Results, Conclusions, and Recommendations.

Discussion of Results

The General Medical students at California University of Pennsylvania were asked to utilize an iBook on an iPad to determine satisfaction and level of value in the technology. The iPads with the iBook were integrated into the class a week before the start of the pulmonary unit for the students to use the week before and during the unit. At this time subjects took the pre-survey. At the end of the unit the subjects took the post-survey answering questions about their perceived level of satisfaction and value of the iPads and the created iBook.

The first research hypothesis stated that the students will find increased value in the iPad and the iBook. A paired samples t-test concluded that there was no

statistical significance between the pre-iPad experience and the post-iPad experience level of value. The mean from the pre-survey was 3.800 (sd=.6325) and the mean from the post-survey was 3.400 (sd=.6992). Both of these questions were answered using a Likert Scale, 1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree. Therefore, the subjects were slightly more agreeable that the iPad and the iBook held value during the unit. Although the perception of value did not change significantly from pre-survey to post-survey, subjects did find value with the experience. When looking at individual questions regarding value (Table 2) subjects did find value in the experience indicating a trend towards agreement in all questions. Interestingly, subjects found increased value with the use of iBook to view skills videos (mean 4.0, sd=1.5041).

Our results are similar to Edgar's study where students were agreeable that the iPad held value.[11] Edgar's study showed that 45% of the 15 participants reported the iBook and iPad was very valuable.[11] There were differences to suggest that subjects in this study thought the iBook was more valuable. In Edgar's study one survey question asked "How valuable were the videos in the iBook?". Subjects reported a mean of 2.30 (sd=.949) using a Likert Scale of 1=Not at all valuable; 2=slightly valuable;

3=somewhat valuable; 4=very valuable; 5=extremely valuable.[11] A similar question from this study asked about the use of the iBook to view video skills to add value to the course. Subjects reported a mean of 4.00 (sd=1.5041). This suggests that student's found the iBook content more valuable in this study. This could also be due to a smaller sample size in this study, 10 subjects, compared to the 15 subjects in Edgar's study.

The second research hypothesis stated that subjects will find increased satisfaction with the iPad and the iBook. A paired samples t-test concluded that there was no statistical significance between the pre-iPad experience and the post-iPad experience regarding satisfaction. The pre-survey was 4.000 (sd=.667) and the post-survey mean was 3.700 (sd=1.0593). Both questions were answered using a Likert scale. Therefore, subjects were agreeable that they were satisfied with the iPad and the iBook at pre-survey and post-survey. When looking at individual questions regarding satisfaction (Table 3) subjects showed higher levels of satisfaction when asked "The use of the iBook to review pulmonary anatomy and physiology increased my SATISFACTION in this course" and "The use of the Internet during class via the iPad increased my SATISFACTION in this course". Subjects were also agreeable to the question

regarding the use of iBook videos increased my satisfaction (mean 4.00, sd=1.0541). When compared to the result from the question regarding the value of the iBook skills videos, the results were similar. One reason for this could be that this generation of students tend to want to observe and visualize skills before performing.[7] Having easy access to the videos on the iPad in the iBook allowed students to view them multiple times before performing the skill.

However, unlike Edgar's study, our subjects reported higher levels of satisfaction. In both studies there was no significant difference between pre-iPad experience and post-iPad experience indicating that satisfaction levels did not change from pre-survey to post-survey. However, the mean scores post-experience were overall higher. In Edgar's study, which had participants utilize iPads, and associated apps in a collegiate Anatomy and Physiology course, the mean for satisfaction was 3.75 (sd=.87) before introducing iPads and 3.42 (sd=1.08) after iPad integration.[11] Both studies support the conclusion that this generation of students are experiencing agreeable levels of satisfaction with mobile technology in their classes.

The results from this study also support the results from previous research. Subjects in the current study stated that they liked how portable the iPad was, which

Payne et al reported as the greatest benefit of this type of technology.[12] One student's comment that the iPad was a distraction is one of the biggest drawbacks to this type of technology. As Ali et al discusses, due to the internet capability of these devices, students are able to access anything on the web at any time there is a connection.[8] During lectures students potentially could be missing important notes and material. However, Miller et al states that the iPad contributions to learning and engagement in the course outweigh that drawback.[3]

Finally, subjects were asked a series of general questions about using the iPads and the iBook (Table 4). These questions were asked using a Likert Scale, 1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree to gauge the effectiveness of the iPads and the iBook. Subject's responses were agreeable to the questions "I will perform better on the test due to utilization of the iBook in the course" with a mean of 4.30 (sd=.8498) and "I think more athletic training/physical therapist assistant courses should utilize the iPad and iBook during instruction" with a mean of 4.30 (sd=.8233). These results indicate that students may have increased academic confidence with use of this interactive learning style. This conclusion is supported by both Bracy et al and

Mazerolle et al in that both articles discuss Millennial students having increased confidence and enjoyment of interactive learning.[6,7] This is due to having instant access to information with these web connected devices.

Conclusions

There has been very little research done with iPad integration in education, with very little performed in athletic training education. However, this study begins to shed light on the implications of iPad and iBook integration within the athletic training curriculum. Therefore, this study used previous research studies about technology in general and a research thesis done by previous graduate students from California University. The purpose of this study was to add to previously performed research and to guide further research. The present study found no statistical significant change between before and after iPad integration in the General Medical pulmonary unit for satisfaction and value.

Yet, the lead researcher was able to detect trends in the data upon examination of individual questions, along with subject comments, to determine that subjects in the study found the iPads and iBook to be slightly agreeable in

both value and satisfaction. Further research should be conducted on the topic with the desired outcome of continued support for increased technology integration into higher education. As mobile technology, mainly tablets and iPads, advance and are more available it is possible other collegiate educational programs will adapt courses to include appropriate apps to aid in learning.

In the future iBooks should continue to be used in the General Medical course. Based on the student feedback from the post-survey alone the benefits, or what they liked, outweighed what they disliked about this technology. Collecting information and adding supporting videos from youtube.com creates an informational package that is easy to use, especially for a generation of students that are known for being comfortable with technology.[6] iBooks are tools that can be given to students in the beginning of the course and viewed as many times as they desire. With many different interactive options while creating the iBook students can have access to the class information even if they are absent from class.

Recommendations

One recommendation for the future would be to utilize a larger sample size. This study was limited to a small sample size due to the low number of students enrolled in the course. A larger sample size would allow for more data and there would be potential to determine if there would be significant changes between pre-iPad/iBook integration and post-iPad/iBook integration.

One other recommendation would be to utilize the iBook technology in multiple units in the General Medical course, or even other courses in the Undergraduate Athletic Training program. Utilizing the iPads and multiple iBooks throughout different units, even consecutive units, in a class could determine if there is a statistical significance in student's attitudes using mobile technology. This could also help determine if it would be beneficial to incorporate iPads into other program at California University of Pennsylvania.

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APPENDICES

APPENDIX A

Review of Literature

REVIEW OF LITERATURE

Athletic training was first established in the 1950s but it was not until 1990 that athletic training was recognized as an allied health care profession by the American Medical Association (AMA).[1] Since the establishment of the National Athletic Trainers' Association (NATA) the profession has and continues to constantly change in attempt to raise standards similar to other allied health professionals. Change is occurring in multiple areas, with increases in technology use and changes to competencies, and curriculum to name a few.

Athletic training educators have been attempting to use technology in education for several decades. One of the first studies on technology in education was published in 1996 by Fincher and Wright via a survey to program directors asking about technology use in their programs, and attitudes about using technology in their classrooms. A majority of program directors answered in the survey that further research is needed to identify if computer based instruction is effective and what makes it effective in

athletic training programs.[2] At the conclusion of their article Wiksten et al, published in 1998, the authors called for additional research to investigate the effectiveness of using a combination of lecture and interactive computer instruction.[3]

The purpose of this Review of Literature is to enlighten the reader on previous work examining technology use in education. This will be accomplished in the following sections: Professional Athletic Training Programs, and Technology. The literature review will end with a summary of the research performed to date.

Professional Athletic Training Programs

Technology in Education

In 1998 Wiksten et al. investigated the effectiveness of an Interactive Athletic Training Education Curriculum (IATEC) program versus a traditional lecture method. It was also reported that there were no studies that have determined the effectiveness of the IATEC program versus traditional lecture instruction in attaining cognitive knowledge and practical assessment skills.[3] The authors suggested that additional research on the topic of

electronic based learning programs versus traditional lecture was warranted in order to investigate all facets of the issues that this new tool presented. Since then other research has been conducted without concrete results that this method is, or is not, better than traditional lecture. Cook et al. reported that increase use in internet-based learning for health professions had some evidence suggesting some effectiveness.[4]

One area in athletic training where internet and online technology is being heavily used is to assist in teaching athletic training students about evidence based practice, also referred to as evidence based medicine. One of the main goals of athletic training is to provide the optimal healing environment for patients.[5] Evidence based practice uses current literature as evidence to make sound clinical and educational decisions.[6] Which for students in entry-level health professions programs it is essential that they be familiar with technology in order to be comfortable using technology as a means to help make these decisions in the workplace.[7] Yet most evidence based practice teaching takes place in the classroom setting.[8] Based on the results of a qualitative study athletic trainers in both educational and patient care roles appeared to value the need for evidence based practice in

the profession.[5] Another study completed by Hadley, Kulier, and Zamora found that their trial demonstrated that both a standard classroom teaching approach and an electronic/internet learning approach lead to an improvement in evidence-based practice knowledge.

The Millennial Generation

The Millennial Generation, or Generation Y, have been defined as those born between 1982 to 2000.[9,10] Monaco and Martin have listed unique characteristics of this generation as "lack of professional boundaries influenced by socialization, a need to have immediate feedback, a sense of entitlement, lack of critical thinking skills, unrealistic expectations, high level of parental involvement, and an expected 'how to' guide to succeed in and out of the classroom".[9] They have also been described as the largest and most diverse generation that are now attending colleges.[9] This generation has grown up with technology in their lives and therefore are very confident, and find it necessary, to use technology in all aspects of life.[10]

Having instant access to information and contact with other people leaves this generation of students looking for

interactive, collaborative, and authentic learning opportunities.[10,11] As a result, this generation seeks to work in groups rather than individually, as the risk of failure when working in a group is smaller.[9] In both the classroom and clinical settings direct contact and mentoring of Millennial students have the impact of increasing motivation and engagement in patient care.[9,11] For success in the classroom academically, and in the clinical setting practically, Millennial students require feedback in a timely manner in order to gauge self-knowledge both academically and in their practical skill level.[9] For educator success with Millennial Students, the researchers recommend using a variety of technology (PowerPoints™, videos, online games, etc.) combined with lecture, guest speakers, and group assignments to satisfy these student's need for technology use and their need for team work.[9,10]

Styles of Learning for the Millennial Generation

It is estimated that more than half of athletic training students' educational experiences are spent in the clinical setting.[12] Evidence suggests that athletic training students today do not always express a dominant learning style preference.[12,13] This generation of athletic training

students, members of the Millennial Generation, prefer to actively engage and experiment to learn in the clinical setting. In the classroom setting students express being most engaged with hands-on learning, with practical and action-oriented situations.[12] However, some admit to wanting to observe in the beginning until they understand the concept.[11] Observation allows the student to visualize the expectations of their chosen field, and retain that information, before having to perform the tasks on their own.[11] The results of a study conducted by Brower et al. on undergraduate athletic training student's learning style and program admission showed that learning style had little effect on academic success, while academic factors seem to have a substantial effect on academic performance in terms of success on the certification examination.

National Athletic Trainers' Association (NATA):

The National Athletic Trainers' Association (NATA) was formally established in 1950.[1] To monitor athletic training education the NATA formed the NATA Professional Education Committee (NATA-PEC) after the first education curriculum was developed and introduced by the NATA Committee on Gaining Recognition in 1959.[2,14] However it was not until the

1970s that athletic training education began to take formal shape. The NATA-PEC developed a list of behavioral objectives for desired learning outcomes based on 11 required courses for athletic training students.[1,14] By 1983 the NATA published a document titled Guidelines for Development and Implementation of NATA Approved Undergraduate Athletic Training Education Program to further organize formal athletic training education.[14] This committee had approved 97 athletic training education programs by 1996; 84 undergraduate programs and 13 graduate programs.[11] By 2005 there were 325 accredited programs.[14] This program increase was partially due to the elimination of the internship route in 2004 in an effort to align athletic training with the standards of other allied health care professions.[1,14]

Commission on Accreditation of Athletic Training Education (CAATE)

The behavioral objectives that were developed by the NATA-PEC during the 1970s became the concept framework for the first edition of Competencies in Athletic Training that were constructed in 1983.[1] The NATA-PEC wanted to encourage programs to become more flexible for students by rearranging content of courses and clinical proficiencies.[14]

Competencies are so engrained into courses that each course serves as a pre-requisite for the next course forcing students who fail, or had other issues, to wait almost a full academic year to retake the course.[14] An article published in 2012 suggest incorporating a cohort model as a method of improving flexibility within athletic training program curriculums.[14] At the time of the study the authors found no previous existing research on the effectiveness of a standardized cohort athletic training curriculum design.[14] The authors found that the benefits of the cohort model included its popularity and corresponding ease of use, the ease of documentation within the current CAATE competency matrix, and a set approach to the curriculum that relies upon the uniformity of coursework to provide a finished product of a reliable quality.[14]

Another large portion of an athletic training student's education is the clinical hours that are required. As previously mentioned it is estimated that more than half of athletic training students' educational experiences are spent in the clinical setting.[12] One study found that entry level certified athletic trainers perceived that approximately 53% of their entry-level professional development came from their clinical education.[1] The idea of clinical education has stemmed from the medical-education

paradigm that has been used to train future physicians. Other allied health professions adopted this concept to train other entry-level professionals.[2] For athletic training the Approved Clinical Instructor (ACI) were approved in 2001 by the Commission on Accreditation of Allied Health Education Programs. Currently called preceptors, these individuals are tasked with guiding clinical learning of athletic training students.[2]

However, in September 2015 the CAATE announced that the official athletic training degree was going to change from a bachelor's degree to a master's degree.[15] This change will become effective in the year 2022.[15] This will also lead to a change in competencies that are being developed and also change requirements to sit for the Board of Certification (BOC) exam.

Board of Certification for Athletic Trainers (BOC)

The BOC was established in 1989 to provide certification and recertification services for the athletic training profession.[16] In the past, to qualify for the certification exam a certain number of clinical experience hours was required. However, that is no longer the case, and completion of the outlined clinical proficiencies is now required.[1] Employers were surveyed for a research study

in 2012, where evidence from the results shows that employers are satisfied with student preparation for entry-level positions despite the first-time pass rate of the BOC exam.[14] Potteiger, Brown, and Kahanov state that the BOC exam first-time pass rate is still below the first-time pass rates of other health care professions. The Examination Report for the 2014-2015 Testing year for the BOC exam shows a first-time pass rate for the 2014-2015 testing year is 80.65%.[16] This statistic has decreased from the first-time pass rate from the 2013-2014 testing year which was 82.85%.[16]

Technology

Back in 1996 Fincher and Wright documented a variety of forms of technology used in education as computer-based instruction, computer-assisted instruction and interactive video.[2] In this study the authors also defined each form of technology used and identified that professors were starting to use computer-based technology but there was no percentage documented for the actual number of people.[2] Fincher and Wright defined Computer Based Instruction as "to include any form of instruction that uses the computer to present instructional information, with computer-

assisted instruction and interactive video being two distinct forms of computer-based instruction". Computer Assisted Instruction (CAI) differs from interactive video in that it incorporates computer-generated graphics and text.[2] CAI has been shown to enhance computer literacy, facilitate decision-making skills, and improve student achievement.[3] Whereas interactive video also uses computer generated graphics and text but also adds features of sound, realistic photos and full motion videos.[2]

Since then technology has rapidly developed, becoming more advanced and mobile. In doctor's offices physicians input patient information on laptops or iPads where it is electronically stored.[7] The 2014 ECAR Study of Undergraduate Students and Information Technology Report stated that out of the 99% of students who own internet-capable devices, 8% own just one device, 92% own at least two devices, and 59% own three or more devices, showing the popularity of these devices.[17] An effect of this development is new technology in the form of applications for new mobile devices. Applications, or apps, have been defined as programs written specifically for mobile phones or devices that have specific functions based on the program.[2,18] While mobile technology has been defined as handheld transmitting device(s) with multi-functional capabilities.[19] One

capability being able to store, transmit and receive health information and has user control over the access to the health information.[19]

Computers and Internet Access

As the digital age continues and the volume of information accessible today is greater than at any time in the past,[20] more things have been moved from a paper format to being accessed on the internet. Before internet was accessible to the public people needed to physically look up information in a directory or phone book, for example.[21] However, the internet has made it simple to find a doctor, a physical therapist, etc. and find ratings created by consumers and users with relative ease.[21]

The internet has also made it easier to communicate with people via social media. Social media websites were created for users to share information and communicate with other users, with the most popular sites being Facebook and Linkedln.[21] Many organizations and groups, such as hospitals, doctors' groups, health organizations have created Facebook pages for users to "like" and leave reviews. These reviews have such an impact that Gangon and Sabus cited a recent study in the American Journal of

Medical Quality that showed for a group of New York hospitals, there was a one percentage point decrease in 30-day mortality rate for every 93 "Likes" on the hospitals' Facebook pages.[21] However many organizations have updated their ethical and professional codes to include policies dealing with social media conduct to maintain professionalism and ethical practices over the internet. In 2010, the American Medical Association (AMA) became the first health care professional body to adopt social media guidelines with the AMA policy: Professionalism in the Use of Social Media.[21]

Tablet Computers

The iPad is a trademark mobile device product produced and distributed by Apple.[7] Since then other companies have produced similar products but Apple remains the leader in educational technology, offering over 10,000 apps in the Education App store.[7] These devices are used to download and run apps. Currently, specific literature regarding the use of apps in athletic training is lacking.[2] Between Apple and Android app stores approximately 50 billion apps were downloaded 2012 alone.[2,18] Keeley et al, Brown et al, and Potteiger et al discuss different applications that are

usable in the athletic training field. The purpose of these apps are vast, ranging from help with anatomy and clinical examinations to safely communicating with students and organizing responsibilities to even evaluating weather conditions.[18,22,23]

Research shows that using a device, such as an iPad, as a part of an educational course can contribute to learning and engagement in the course.[24] These devices are being used to run apps that help to develop topics and ideas. DelGaudio researched participant value and satisfaction after a lab in collegiate Kinesiology using the Dartfish program. The results determined that 60% of participants stated that they agreed or strongly agreed that the iPads increased their satisfaction with the course.[25] Another study conducted by Edgar that used the program iBook in a collegiate Anatomy and Physiology course also measured participant sense of value and satisfaction. Results from that study concluded that there was no significant difference in the change of satisfaction with the use of iPads but 45% answered that they were very valuable.[26] Payne et al highlights the ease of creating and implementing iBooks.[27]

Other types of Technology

Outside of mobile devices and apps other forms of technology are available to educators and students. One such method is cloud computing. The National Institute of Standard and Technology's define cloud computing as "a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction".[28] In the article Perkely stated benefits of cloud computing for both educators and athletic training students. Educators could benefit from this service by logging on with a special password and entering and updating a student's progress. Athletic training students could benefit from cloud computing by entering and updating competencies, clinical hours, and other evaluations performed.[28]

Other forms of technology that are integrated in the class room are the internet/digital course material and smartboards. In a study performed by Cook et al. results showed that effects of internet-based learning compared to

traditional lecture methods are similar and effectiveness of both methods are also similar.[4]

Effects of Technology

As technology has advanced, the benefits of using technology have increased. With today's technology people have the ability to access the Internet almost anywhere anytime using wireless Internet and mobile devices.[21] Different apps and programs allow for different benefits for the users. Such benefits for patients are, but not limited to, monitoring symptoms and pain levels of injuries or diseases, monitor effectiveness of interventions and even improve medication adherence.[19] People are also using this technology to get fit. Programs and apps have been designed to assist and motivate people during exercise and in eating properly.[29]

Athletic trainers can benefit from apps that are designed to monitor and check weather conditions and apps that can assist with clinical evaluations.[22,30] These apps are becoming very popular to assist in evaluating and diagnosing head injuries as they help with documentation of evaluations, can be consulted when deciding return-to-play timelines. This could especially be helpful in order to try

and avoid the potential legal litigation surrounding head injuries that is prevalent in today's society.[22] In the clinical setting preceptors are able to keep apprised of what their students are learning in the classroom through technology such as iPads, apps, and push notifications.[7] This allows preceptors to better help the athletic training students apply classroom knowledge into the clinical setting.

Despite the increase use of technology in education and our daily lives there are some drawbacks to its uses in educational settings. Previously there were few programs that an institution or educator could choose from. There was also the previous drawback of 2-Dimensional graphics that some argued hindered the ability to facilitate learning.[3] However today that is no longer the case, as there are many different programs available with better graphics and simulations, yet the overall quality of some programs is called into question.[20] One study conducted Wiksten, Spanjer and LaMaster looked at the effectiveness of one multimedia program versus traditional lecture in athletic training.[31] The results of this study were different than other studies previously done by Wiksten et al and Voigt et al. The authors speculated that the specific program selected for the study did not have an

impact on the students as it did in the other studies the results were compared to.[32,33] This is an example of how proper selection and quality of programs are necessary to have an impact on student response and attitude toward certain forms of technology.

Institutions and programs have other challenges before picking and choosing which apps and software programs to make available to athletic training students in class. One major factor is cost. Upon download some apps require a fee while some also require a paid subscription for continual use.[23,29] For some programs these subscription fees are not feasible due to certain budgets, making them unavailable to students unless the student were to pay the fee.[2,22] There is also the fact that not all professors and clinicians are familiar with these programs. Therefore, they are unable to adequately incorporate them into teaching or practice for them to become effective.[22] This lack of experience can create feelings of anxiety and stress for professors when attempting to use computer and mobile device programs and apps in front of a class.[3] One last major drawback for some is that certain apps can only function on certain operating systems. Depending on the device purchased decides which operating system the device runs on; Apple devices, such as the iPad, run on the iOS system while other devices are

considered Androids.[23] Mobile devices also have a certain amount of storage space available for apps.[23]

Drawbacks concerning mobile technology, i.e. cell phones, are discussed as this form of technology is in every high school and collegiate student's hands. In education instructors are finding mobile devices distracting to students and more often than not banning their use in class altogether.[17,34] There are concerns when these mobile devices are used to store health information. Richardson and Reid cited that the Health Information Portability and Accountability Act (HIPAA) does not apply to mobile health data that is stored on mobile devices, unless the information is stored on an electronic health system

Summary

Technology, in the forms of iPads with apps, and online course work, are being incorporated into educational and clinical settings as a means to ease some of the burden and stress that are often placed on athletic trainers. Since the 1990s when technology in education has been studied, especially in athletic training education, results have been either non-conclusive or contradictory to other

results from other research studies. There is a constant need for research of technology in education as all forms of technology continue to advance and develop. It is important to determine if this method is the most beneficial and effective with today's student population in order for them to be successful.

APPENDIX B

The Problem

STATEMENT OF THE PROBLEM

During the four years of in athletic training programs students, learn the knowledge and skills that are required of an entry level athletic trainer. Technology use has increased as it becomes more accessible and available to the public. The Millennial Generation is the first generation that has grown up with constant access to personal technology, a factor contributing to its increased use. Studies have shown that the integration of technology in education can have value to both students and educators but the exact methods of implementation into classes still require further research.

The purpose of this study is to examine the use of the iPad, and specifically the iBook app, in a professional athletic training education program and to determine if students find value find satisfaction in the implementation in the General Medical class. The results of this study will benefit both athletic training professors and preceptors as it would help them tailor their teaching to enable students to reach their full learning potential. The promise of technological aids, such as iPads and their "apps", include increased access to information as the iPad offers mobility to users. However, it is up to the educator

to incorporate these devices appropriately for students to gain the benefits that mobile devices can offer.

Definition of Terms

The following definitions of terms will be defined for this study:

1) iPad – tablet computer created by Apple Computer, Inc. in 2010. It is a touchscreen, portable computer that has the capability to aid its owner in multiple uses, such as personal use, education, business, medical documentation, etc.
2) iBook – an app created for Apple Computer Inc. products. Using iBooks Author users can gather information with interactive images, media, and links in one place.
3) Satisfaction – fulfillment of the participant's expectations.
4) Value – what the participant's view as important to their learning

Basic Assumptions

The following are basic assumptions of this study:

1) The subjects will be honest when they complete their demographic sheets and surveys.

2) The subjects will use the iBook before coming into class.

Limitations of the Study

The following are possible limitations of the study:

1) There is a low number of subjects for this study.
2) Subjects can be inconsistent in responses.
3) Subjects level of experience can vary depending if they previously own an iPad or another tablet.

Significance of the Study

The goal of professional athletic training programs is to prepare students with the necessary knowledge and skills that are required of an entry level athletic trainer. One study performed by Mazerolle et al revealed that more than one half of athletic training students' educational experience is spent in a clinical setting.[12] According to the BOC Role of Delineation Study, four out of the five domains listed in the study require direct contact and hands-on work with patients.[35] Previous studies have shown that athletic training students are hands-on, visual learners with early observation from a preceptor or mentor.[11,12] The purpose of this study is to examine if incorporating mobile technology such as an iPad with "apps"

has a beneficial effect for students in overall academic success in professional athletic training education programs.

Traditionally college professors would use chalkboards, lectures, and upon its creation PowerPoint™ slides, to get the main points across during a class. However, as technology becomes more accessible and available to the public it has become more essential in our social lives and education. The current generation, often called the Millennial Generation, is the first generation that has grown up with easier access to technology, creating both positive and negative effects on learning.[9] Monaco and Martin suggest that to maximize benefits for these Millennial Generation students, professors should not limit learning to direct lecture with PowerPoint slides. Instead they recommend using a variety of methods that actively engage students.

The results of this study will provide more information as to how valuable and how satisfied students are with technology being incorporated into their class, specifically in this case the use of iBooks in a General Medical course. The information gathered from this study could also help determine better methods of delivering course information to students to facilitate better

learning and course content retention.

APPENDIX C

Additional Methods

APPENDIX C1

Institutional Review Board –

California University of Pennsylvania

Institutional Review Board
California University of Pennsylvania
Morgan Hall, Room 310
250 University Avenue
California, PA 15419
instreviewboard@calu.edu
Robert Skwarecki, PhD, CCC-SLP, Chair

Dear Ms. Moore:

Please consider this email as official notification that your proposal titled "Using iBook Technology in Professional Athletic Training Programs" (Proposal #15-040) has been approved by the California University of Pennsylvania Institutional Review Board as submitted.

The effective date of the approval is 02/17/2016 and the expiration date is 02/16/2017. These dates must appear on the consent form.
Please note that Federal Policy requires that you notify the IRB promptly regarding any of the following:

(1) Any additions or changes in procedures you might wish for your study (additions or changes must be approved by the IRB before they are implemented)

(2) Any events that affect the safety or well-being of subjects

(3) Any modifications of your study or other responses that are necessitated by any events reported in (2).

To continue your research beyond the approval expiration date of 02/15/2017 you must file additional information to be considered for continuing review. Please contact instreviewboard@calu.edu

Please notify the Board when data collection is complete.

Regards,
Robert Skwarecki, PhD, CCC-SLP
Chair, Institutional Review Board

Appendix C2

Pre-Survey

California University of Pennsylvania
Department of Health Science

Please take a moment to complete this survey evaluating the potential utilization of technology in your college courses. This information will allow us to make informed choices as to how to use technology in the future. Your responses are confidential and appreciated.

Demographic Information

What is your gender?

- ☐ Female
- ☐ Male

Age _____

Which of the following personal technology items do you currently own?

- ☐ iPad
- ☐ iPhone
- ☐ iPod touch
- ☐ Android smart phone
- ☐ Other tablet computer _____
- ☐ Other _____

How would you rate your comfort level with technology?

- ☐ Very comfortable
- ☐ Comfortable
- ☐ Uncomfortable
- ☐ Very uncomfortable

If you currently have a handheld mobile device (smartphone or tablet), how do you use this device?

- ☐ Access Desire2Learn
- ☐ Access the internet
- ☐ Access the internet for academic purposes
- ☐ Download/access to podcasts
- ☐ Download/access to course lectures
- ☐ Download/access to other videos for academic purposes
- ☐ Download/access eBooks
- ☐ Download/access eBooks for academic purposes
- ☐ Play games
- ☐ Send and receive email
- ☐ Use camera to take and share pictures
- ☐ Use camera to take and share videos
- ☐ Edit/add effects to pictures
- ☐ Edit/add effects to videos
- ☐ Record voice messages/memos
- ☐ Access maps
- ☐ Track fitness activities
- ☐ Track nutritional intake
- ☐ Other uses (please list)

Please indicate your agreement with the following statements. I believe that the iPad COULD be very valuable to me in the following areas.	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Brainstorming / generating ideas	1	2	3	4	5
Finding research articles	1	2	3	4	5
Organizing information	1	2	3	4	5
Patient treatment/rehab record keeping	1	2	3	4	5
Analyzing information	1	2	3	4	5
Presenting information	1	2	3	4	5
Collaborating and working with classmates	1	2	3	4	5
Accessing the internet to find information	1	2	3	4	5
Recording audio for educational/clinical purposes	1	2	3	4	5
Recording video for educational/clinical purposes	1	2	3	4	5
Creating documents	1	2	3	4	5
Reviewing course materials	1	2	3	4	5
Communicate with other students via video conferencing software	1	2	3	4	5
Apply course content to solve problems	1	2	3	4	5
Produce projects to enhance learning	1	2	3	4	5
Learn course content	1	2	3	4	5
Participate in course activities in ways that enhance my learning	1	2	3	4	5
Connect course related ideas and concepts in new ways	1	2	3	4	5
Develop skills that apply to my academic career and professional life	1	2	3	4	5
I will be more motivated to participate in course activities that utilize the iPad when compared to activities that do not.	1	2	3	4	5
Communicate with professors via video conferencing software	1	2	3	4	5

Instructional Technology – Please indicate how strongly you agree with the following statements in regards to your satisfaction with the technology and value it had to your learning. Please use the following definitions of satisfaction and value: Satisfaction – fulfillment of expectations Value – importance to your learning	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. The use of the iPad will increase my SATISFACTION in this course	1	2	3	4	5
2. The use of the iPad will add VALUE to the course	1	2	3	4	5

Please list any other areas where you believe an iPad could be valuable to you in this course:

Appendix C4

Post-Survey

California University of Pennsylvania
Department of Health Science

Please take a moment to complete this survey evaluating the utilization of technology in your ATE 315 course this semester. This information will allow us to make informed choices as to how to use this technology in the future. Your responses are confidential and appreciated.

Demographic Information

What is your gender?

- ☐ Female
- ☐ Male

Age _____

Which of the following personal technology items do you own?

- ☐ iPad
- ☐ iPhone
- ☐ iPod touch
- ☐ Android smart phone
- ☐ Other tablet computer
- ☐ Other _____

How would you rate your comfort level with technology?

- ☐ Very comfortable
- ☐ Comfortable
- ☐ Uncomfortable
- ☐ Very uncomfortable

The next few pages will assess the use of the iBook class to do assignments. The researchers in this project created an iBook, provided on iPads, to allow students to review information on an interactive platform. The students reviewed the iBook material at their own pace with the ability to view online videos and to retrieve other material through web links. In addition to the specific tasks, the researchers are also interested in the students' SATISFACTION and VALUE of the technology used in this course as a whole. Please provide your honest opinion in response to the questions.

How many days a week did you spend looking at the iBook in the last 2 weeks? Please circle one response.				
0-1 days a week	2-3 days a week	4-5 days a week	6-7 days a week	I did not look at the iBook

How many minutes per day, on average, did you spend looking at the iBook in the last 2 weeks? Please circle one response.			
0-30 minutes per day	31-60 minutes per day	61-120 minutes per day	More than 120 minutes per day

Instructional Technology – Please indicate how strongly you agree with the following statements in regards to your satisfaction with the technology and value it had to your learning. Please use the following definitions of satisfaction and value: Satisfaction – fulfillment of expectations Value – importance to your learning	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
3. The use of the iPad increased my SATISFACTION in this course	1	2	3	4	5
4. The use of the iPad added VALUE to the course	1	2	3	4	5
5. The use of the iPad increased my interest in the course	1	2	3	4	5
6. The use of the iBook to review pulmonary anatomy and physiology increased my SATISFACTION in this course	1	2	3	4	5
7. The use of the iBook to review pulmonary anatomy and physiology added VALUE to the course	1	2	3	4	5
8. The use of the iBook to review pulmonary anatomy and physiology increased my interest in the course	1	2	3	4	5
9. The use of the iBook to review pulmonary exercise physiology increased my SATISFACTION in this course	1	2	3	4	5
10. The use of the iBook to review pulmonary exercise physiology added VALUE to the course	1	2	3	4	5
11. The use of the iBook to review pulmonary exercise physiology increased my interest in the course	1	2	3	4	5
12. The use of the iBook to learn about pulmonary illnesses/disorders increased my SATISFACTION in this course	1	2	3	4	5
13. The use of the iBook to learn about pulmonary illnesses/disorders added VALUE to the course	1	2	3	4	5

14. The use of the iBook to learn about pulmonary illnesses/disorders increased my interest in the course	1	2	3	4	5
15. The use of the iBook to view skills videos (using a meter-dose inhaler, nebulizer, and pulse oximeter) increased my Satisfaction in this course.	1	2	3	4	5
16. The use of the iBook to view skills videos (using a meter-dose inhaler, nebulizer, and pulse oximeter) added Value in this course.	1	2	3	4	5
17. The use of the Internet during class via the iPad increased my SATISFACTION in this course	1	2	3	4	5

Please indicate how strongly you agree with the following statements in regards to your experience with iPad use in class this semester.	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
18. If given the opportunity to take a course utilizing the iPad or iBook again, I would choose to do so.	1	2	3	4	5
19. I will perform better on the test due to utilization of the iBook in the course.	1	2	3	4	5
20. I will consider using the iPad to add media (pictures, video, etc) to future projects.	1	2	3	4	5
21. The iPad helped me develop technological skills that will help me in the future.	1	2	3	4	5
22. I think this course should continue using iPads and iBooks in the future.	1	2	3	4	5
23. I think more athletic training/physical therapist assistant courses should utilize the iPad and iBooks during instruction.	1	2	3	4	5
24. The value the iBook had in my learning as used in class exceeded my expectations.	1	2	3	4	5

Please indicate your agreement with the following statements. I believe that the iPad COULD be very valuable to me in the following areas.	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
25. Brainstorming / generating ideas	1	2	3	4	5
26. Finding research articles	1	2	3	4	5
27. Organizing information	1	2	3	4	5
28. Patient treatment/rehab record keeping	1	2	3	4	5

29. Analyzing information	1	2	3	4	5
30. Presenting information	1	2	3	4	5
31. Collaborating and working with classmates	1	2	3	4	5
32. Accessing the internet to find information	1	2	3	4	5
33. Recording audio for educational/clinical purposes	1	2	3	4	5
34. Recording video for educational/clinical purposes	1	2	3	4	5
35. Creating documents	1	2	3	4	5
36. Reviewing course materials	1	2	3	4	5
37. Communicate with other students via video conferencing software	1	2	3	4	5
38. Communicate with professors via video conferencing software	1	2	3	4	5

What did you like and dislike about each of the technologies utilized in this course?	Like	Dislike
iPad		
iBook		

Do you have any other comments or suggestions for using iPads or iBooks in the future?

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ABSTRACT

TITLE: USING IBOOK TECHNOLOGY IN ATHELTIC TRAINING EDUCATIONAL PROGRAMS

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CONTEXT: Technology use has increased as it becomes more accessible and available to the public. This generation of students, referred to as the Millennial Generation, is the first generation that has grown up with constant access to personal technology. Previous research has shown that the integration of technology in education can have value to both students and educators but the exact methods of implementation into classes still require further research

OBJECTIVE: This study examined perceived value and effectiveness of iPad/iBook integration into General Medical course using survey questions pertaining to satisfaction, value and general effectiveness of the iPad and the iBook.

DESIGN: This study was primarily a descriptive study.

SETTING: General Medical course at California University of Pennsylvania. Participants: 10 subjects, 7 females and 3 males, who were enrolled in the course.

INTERVENTIONS: Once the iBook was created and the researcher received IRB approval an instructional session was held 1 week prior to the start of the pulmonary unit. Subjects were instructed on their role and expectations of the study and assigned an iPad with the created iBook. The pre-survey was completed at this time. At the end of

the pulmonary unit, approximately one week later, the iPads were collected and the post-survey was distributed, completed and collected.

MAIN OUTCOME MEASURES:
Subjects will answer questions using a Likert Scale that pertain to satisfaction, value, and general satisfaction with the iPad and iBook.

RESULTS: Completed surveys concluded no significant different between pre-iPad and post-iPad integration for both hypotheses. Hypothesis 1 showed ($t(9)=1.177$, $p>.05$). Hypothesis 2 showed ($t(9)=.758$, $p>.05$). Additional results were found for questions pertaining to value and satisfaction along with general questions regarding the effectiveness of iPad/iBook integration.

CONCLUSION: This study found no significant change from pre-iPad integration to post-iPad integration. However, trends in the data based on examination of individual survey questions, along with subject feedback, concluded that subjects were satisfied and found value in the created iBook and iPad when integrated into the General Medical course.

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