

Podcasting as an Instructional Method: Case Study of a School Psychology Class

Jeff A. Tysinger, Dawn P. Tysinger

Abstract—There has been considerable growth in online learning. Researchers continue to explore the impact various methods of delivery. Podcasting is a popular method for sharing information. The purpose of this study was to examine the impact of student motivation and the perception of the acquisition of knowledge in an online environment of a skill-based class. 25 students in a school psychology graduate class completed a pretest and posttest examining podcast use and familiarity. In addition, at the completion of the course they were administered a modified version of the Instructional Materials Motivation Survey. The four subscales were examined (attention, relevance, confidence, and satisfaction). Results indicated that students are motivated, they perceive podcasts as positive instructional tools, and students are successful in acquiring the needed information. Additional benefits of using podcasts and recommendations in school psychology training are discussed.

Keywords—Motivation, online learning, pedagogy, podcast.

I. INTRODUCTION

HIGHER education embraces the use of technology and online learning platforms to assist learners in face to face, hybrid, and online courses [22]. Podcasting is a technology that has gained popularity as a method to deliver instruction in video and audio formats. They are a convenient, efficient, and user-friendly way to get information. Podcasts may be for entertainment or to gain knowledge. The use of podcasts as a learning mechanism has been explored in many academic settings [1], [5], [19], [21], [24]-[29], [32].

A podcast can be an audio recording, a video podcast, or an enhanced podcast. Audio podcasts include only audio and require very little storage space. Video podcasts include audio and video and require considerable storage space. An enhanced podcast is a slideshow with an audio file connected to the slides, and the storage space would depend on the quality of the images. School psychologists spend a good deal of time traveling between schools. Podcasts would be a convenient and efficient way to gain some professional based knowledge. Using podcasts in the students' training may increase the likelihood of podcast use in the future.

The use of podcasting has been examined in a variety of ways with regard to online learning [19], [24], [26], [28]. The perception of the impact of podcasting on performance has been mixed, but the majority of studies shows that students have a positive perception of podcasts' impact on their

performance [4] and in learning in general [2]. Empirical studies have had mixed results in determining if podcasts increase learning. Some studies have found that podcasts enhance learning and increase performance [21], [32]. Yet, other studies have found that students exhibit lower performance on exams when podcasts are used in place of traditional lectures [11]. It seems that the use of technology can enhance learning if it is appealing to the learner. It has been shown that students are interested because the technology is novel and this interest may be lost as the novelty wears off [33]. This is especially true for students in distance learning [33]. Interest and motivation are key in overcoming this challenge.

Podcasts take many forms and can enhance the learning environment. Lee [17] demonstrated that podcasts may assist in students feeling less isolated in an online teaching platform. Other studies have shown student interest and curiosity in the covered topics has increased with the use of educational podcasts [12]. Podcasts can vary a great deal in presentation. The presenter has an endless way of presenting the information. For example, one can use an interview, a monolog, a cohost conversation, a panel, storytelling, and theater just to name a few. This variability is important in getting the students' attention. However, it must be compatible to the students' goals and learning style. The podcast should also be connected to prior learning experiences. This speaks to a clear and well thought out design of the podcast. It should make sense to the listener from the order information is presented to the way it is delivered. When dealing with a skill-based class using practitioners of the field in the podcast may help with confidence. The quality of the podcast will assist with the overall satisfaction. Successful podcasts were found to be shorter in duration, approximately 30 minutes [5]. The less complicated the access and use, the more preferable the podcast as well [23]. These findings suggest that motivation of learner is a key element.

There is one theory focused on student motivation that has held strongly over time. This theory is Keller's [14] ARCS model which is an acronym for attention, relevance, confidence, and satisfaction. It was derived from a comprehensive review and synthesis of motivational research and its influence on learning. Regarding the concept of attention, the research has been focused on curiosity, arousal, and boredom [10]. For learning, the intent is to create a sense of inquiry in the learner. To ensure this occurs, there must be considerable variability. In addition, it is necessary for the instruction to be consistent with the students' goals and compatible with her learning style. In other words, it must be

J. A. Tysinger is with Georgia Southern University, Statesboro, GA 30460 USA (corresponding author, phone: 912-678-6936; fax: 912-478-7104; e-mail: jtysinger@georgiasouthern.edu).

P. D. Tysinger is with Georgia Southern University, Statesboro, GA 30460 USA (dtyssinger@georgiasouthern.edu).

relevant to the learner which stems from the considerable constructivist literature [7]. The instructional experience should be connected to prior learning experiences [15]. The next requirement is confidence. The student must believe that success is possible using this method. They must believe it is possible to gain the information necessary from the method and that they will be successful in retaining and using the information [15]. The first three requirements must be met before the final one, satisfaction, can be met. This is when the student has positive feelings about the learning experience. It has been demonstrated that if all these requirements are met, then students will have a high level of motivation to learn [30]. Clearly designed instructional material can contribute to gaining and keeping attention [20], but a lack of motivation may prevent learners from focusing on the instruction [13].

Research studies investigating student motivation with podcasts as a learning tool have been explored but are limited [29]. Thus, the current study is designed to add to this literature using utilizing the Instructional Materials Motivation Survey (IMMS) to assess motivational factors and determine whether using Podcasts enhances the students' motivation and demonstrates learning of the material. Specifically, this study is designed to examine:

1. Can podcasts be used to deliver information in a graduate class in a way that the students are motivated and successful in acquiring the information?
2. What is the perception of podcasts as an instructional method with graduate students?

II. METHODS

A. Participants

All students in a graduate class ($n = 24$) consented to participate in the study. Anonymous data were collected using Qualtrics during the course but not analyzed until after the course grades were finalized. The students were in an advanced course in school psychology about crisis intervention and prevention. All of the students were in an Education Specialist program in school psychology and had completed two years of course work in the three-year program. The class make up was typical of a school psychology program. The mean age was 26 but ranged from 22-47 years old. There was only one male and 23 females. Two people did not identify race (8%), four identified as Black or African American (17%), and 18 identified as White (75%).

B. Procedures

Institute Review Board permission was obtained and data were collected from a graduate class regarding perceptions of podcasts and learning. Before any instruction, a demographic survey was administered. The survey included questions about podcasts and podcast usage. The course was delivered in the summer in an online platform. Each week had specific topics and objectives. These objectives were met with readings, podcasts, videos, discussion posts, questions posted in a poll, votes on those questions, and weekly reflections. At the end of

the course, the IMMS was administered with three additional post course questions. Data from the pre/post survey, the IMMS, final exam, and student surveys were analyzed after the course was complete and grades were submitted.

C. The Course

The course investigated exemplary crisis intervention and prevention programs that promote the mental health and physical well-being of all individuals (school and communities). This course also examined the history and development of crisis intervention. The focus was on developing skills and knowledge required to effectively intervene and assist children, adults, and families during periods of crisis. The course highlighted the importance of prevention in decreasing the number and severity of crisis situations.

D. Podcasts

The podcasts consisted of three parts: core information, an interview, and responses to student questions. Core information was information that was typically presented in a lecture or discussion format. This portion was 20 to 30 minutes. The interview portion was an interview with a person from an organization or a person with considerable experience in the topic area. This portion was approximately 10 to 15 minutes. The final section of the podcast was the student questions. These questions were based on the information from the prior podcast. Students would post questions on a poll and then rank order the questions based on those they wanted answered the most. A link was sent to the individuals with the top three questions and they would submit their question verbally. These questions were then imbedded in the podcasts with the responses.

E. Instruments Final Exam and Final Grades

The final exam was a cumulative multiple-choice exam that covered all topic areas. It was a timed test taken in an online platform. It was 100 questions. Students were graded on discussion question responses, weekly reflections, a suicide assessment video, and a final exam. The final grade was based on a straight percentage 70 to 79.9 was a C, 80 to 89.9 was a B, and 90 and above was an A.

F. Instruments Student Ratings of Instruction

The student ratings were divided into three parts. The first asked about pre and post interest. The second focused on the content, organization, focus, relevancy, and expectations. The final part focused on the instructor, grading, communication, and availability. The survey consisted of two questions with a five-point Likert scale ranging from one (not interested) to five (very interested) and 12 questions ranging from one (strongly disagree) to five (strongly agree).

G. Instruments Pre and Post Survey

The survey was three questions focused on interest, convenience, and learning. A five-point Likert scale ranging from one (not true) to five (very true) was used. The wording was modified to fit the presentation. The wording on the pre-

survey was: I believe podcasts will be an interesting way to be exposed to the course information, I believe podcasts will be a convenient method of gaining information on this subject, and I believe podcasts will increase my learning. The wording on the post survey was: I believe podcasts were an interesting way to be exposed to the course information, I believe podcasts were a convenient method of gaining information on this subject, and I believe podcasts increased my learning.

H. Instruments Instructional Materials Motivation Survey

The IMMS was designed to assess how instructional materials affect learner motivation [30]. It was designed based on the ARCS model and has been in many studies [1], [4], [5], [8]-[10], [12], [19], [21], [22], [24], [27], [29], [31] and typically used in assessing motivation in online learning [18]. The survey consisted of 36 questions with a five-point Likert scale ranging from one (not true) to five (very true). 26 items were worded in a positive way, and ten items were worded in a negative way. There were four sub scales in the measure. They were attention, relevance, confidence, and satisfaction. The attention scale measures focus, arousal, and boredom. Specifically, it dealt with the content amount, content density, and presentation. The relevant scale focused on utility and application of the material. The confidence scale focused on the individuals' perceptions of the difficulty in absorbing the information. Finally, the satisfaction scale focused on individuals' feelings of the learning experience, specifically rewards and recognition. The IMMS has a reliability coefficient of .96 and is considered a valid instrument [16]. Instrument was modified to assess podcasting on student motivation [29]. Permission was obtained by the author to use the instrument. The modified version for podcasts was used.

I. Instruments IMMS Analysis

The reverse coded items were corrected, and Cronbach alpha coefficients were calculated for the overall instrument (IMMS, $\alpha = .95$) and each scale (Attention, $\alpha = .86$; Relevance, $\alpha = .77$; Confidence, $\alpha = .79$; and Satisfaction, $\alpha = .87$).

III. RESULTS

A majority of participants noted that they regularly or sometimes listen to podcasts (61.5%, $n = 16$). However, 15.4% ($n = 4$) noted that they had listened to podcasts just a few times and 23.1% ($n = 6$) of participants had not listened to podcasts. Six people (23%) indicated that they did not listen to podcasts. Of those that listen to podcasts, participants indicated that they listen to them more than once a week (15.4%, $n = 4$), once a week (34.6%, $n = 9$), once a month (15.4%, $n = 4$), and less than once a month (11.5%, $n = 3$). Of those that listen to podcasts, the typical reason was split between entertainment (38.5%; $n = 10$) and knowledge/education (38.5%, $n = 10$). The majority had not listened to podcasts about school psychology (58%, $n = 15$) or crisis work (92%, $n = 22$).

Examining the pre and post survey questions, students averaged a 4.3 out of 5 with one being "not true" and five being "very true". There was a slight increase but no real

difference in these beliefs after the course was complete. Students averaged a 4.5 out of 5. See Table I for specific items.

TABLE I
PRE/POST SURVEY QUESTIONS

Pre	Post	Pre		Post	
		M	SD	M	SD
I believe podcasts will be an interesting way to be exposed to the course information.	I believe podcasts were an interesting way to be exposed to the course information.	4.3	.94	4.5	.97
I believe podcasts will be a convenient method of gaining information on this subject.	I believe podcasts were a convenient method of gaining information on this subject.	4.4	.70	4.5	.93
I believe podcasts will increase my learning.	I believe podcasts increased my learning.	4.3	.75	4.4	.92

The response scale on the IMMS ranges from one (not true) to five (very true). Therefore, the minimum and maximum score of the IMMS is 36 and 180, respectively. The total scores ranged from a 92 to 180 ($M = 149$, $SD = 19.4$). This would indicate that the students were motivated by the podcasts. Table II lists the descriptive statistics for the attention subscale, Table III for the relevance subscale, Table IV for the confidence subscale, and Table V for the satisfaction subscale. Students averaged mostly true to the statements about attention ($M = 4.2$), relevance ($M = 4.4$), confidence ($M = 4.0$), and satisfaction ($M = 3.8$).

TABLE II
ATTENTION SUBSCALE

No.		M	SD
2	There was something interesting at the beginning of the podcasts that got my attention.	4.0	.81
8	The podcasts are attention-grabbing.	4.1	.95
11	The quality of the podcasts helped to hold my attention.	3.9	1.3
12	The material in the podcasts is so abstract that it was hard to keep my attention on them.	1.5	.83
15	The podcasts are dry and unappealing.	1.3	.62
17	The way the information is arranged in the podcasts helped keep my attention.	3.8	1.0
20	The podcasts included information that stimulated my curiosity.	4.3	.57
22	The amount of repetition of material in the podcasts caused me to get bored sometimes.	1.5	.83
24	I learned some things from the podcasts that were surprising or unexpected.	4.5	.78
28	The variety of the podcasts helped to keep my attention on the lessons.	3.7	1.0
29	The presentation style of the podcasts is boring.	1.5	.88
31	There's so much content in the podcasts it is irritating.	1.3	.60

Note – items in () are the reverse coded items

The final exam and final grade were used as measures of knowledge and skill acquisition. The students obtained an average score of a high B on the final ($M = 88.5$, $SD = 4.6$). Scores ranged from 81 to 97. There were 15 Bs and 9 As. For the class grade, the average was a low A ($M = 90.6$, $SD = 3.2$). There were 6 Bs and 18 As. Both the final exam and final grades are commensurate with grades from the same course delivered in a face-to-face method. Based on the final exam

and grade, it appears that the knowledge and skills were obtained.

TABLE III
RELEVANCE SUBSCALE

No.		M	SD
6	It is clear to me how the content in the podcasts is related to things I already know.	4.2	.93
9	There were stories or examples in the podcasts that showed me how this material could be important to some people.	4.6	.77
10	Completing the lessons successfully after using the podcasts was important to me.	4.4	1.1
16	The content of the podcasts is relevant to my interests.	4.4	.71
18	There were explanations or examples of how people use the material in the podcasts.	4.3	.81
23	The content and style of presentation in the podcasts conveys the impression that the content is worth knowing.	4.3	.92
26	The content in the podcasts was not relevant to my needs because I already knew most of it.	1.0 (5.0)	.20
30	I could relate to the content of the podcasts to things that I have seen, done, or thought about in my own life.	3.9	1.1
33	The content in the podcasts was useful to me.	4.5	.83

TABLE IV
CONFIDENCE SUBSCALE

No.		M	SD
1	When I first listened to the podcasts, I had the impression the lesson would be easy for me.	2.67	1.24
3	The materials in the podcasts was more difficult to understand that I would like for it to be.	1.2 (4.8)	.38
4	After using the podcasts I feel confident that I knew what I was supposed to learn from the lesson.	3.8	1.1
7	Many of the podcasts had so much information that it was hard to pick out and remember the important points.	2.3 (3.8)	.85
13	As I use the podcasts, I was confident that I could learn the content.	4.1	.95
19	The material in the podcasts was too difficult.	1.2 (4.8)	.59
25	After using the podcasts for a while I was confident I would be able to pass a test on the material.	3.5	1.1
34	I could not really understand quite a bit of the material in the podcasts.	1.3 (4.7)	.69
35	The good organization in the content of the podcasts help me to be confident that I would learn the material.	3.8	.98

TABLE V
SATISFACTION SUBSCALE

No.		M	SD
5	Completing the exercise in the lesson after using the podcasts give me a satisfying feeling of accomplishment.	3.6	1.1
14	I enjoyed the podcasts so much and I would like to know more about this topic.	4.0	1.1
21	I really enjoyed studying the material in the podcasts.	4.0	1.0
27	The feedback from my instructor helped me feel rewarded for my efforts using the podcasts.	3.3	1.2
32	It felt good to successfully use the podcasts.	4.1	1.1
36	It was a pleasure to use such well-designed podcasts.	3.8	.89

The perception of podcasts as an instructional tool was examined using the students rating of instruction and open-ended statements. It is important to note that the majority of students completed the rating. This is not common. Students noted a high level of interest before the class ($M = 4.2$) and a very high interest after the class ($M = 5.0$). The ratings were very high for both course elements and the instructor. Ratings from the same course taught in a face-to-face manner are provided for comparison, see Table VI. Based on these ratings, interest was high before the class ($M = 4.2$, out of 5)

and higher once it was completed ($M = 5$ out of 5). The content, organization, focus, relevancy, and expectations were also viewed as positive ($M = 4.7$ out of 5). The ratings for the instructor, grading, communication, and availability of instructor were also high ($M = 4.8$ out of 5). Table VII lists the open-ended comments. Based on the high ratings and positive comments about the podcasts, it appears that students perceive the podcast as a useful and convenient method of obtaining the needed information.

TABLE VI
STUDENT RATINGS OF INSTRUCTIONS

	Podcast course	Face to face
Students	22/24	16/23
Interest	4.2-5.0	3.8-3.9
Course Elements	$M = 4.7$	$M = 3.9$
Instructor Ratings	$M = 4.8$	$M = 3.7$

TABLE VII
STUDENT COMMENTS FROM THE STUDENT RATINGS OF INSTRUCTIONS

What aspect of the course contributed most to your learning?	In what way can the course be improved?
The use of podcasts were amazing.	This information is so important that we need more of it.
I already was interested in podcasts and I travel frequently, so I was able to easily access the course information.	A PowerPoint outline along with the podcast would be helpful for the visual learners
I enjoyed the Podcasts and the flip grid although it could be a pain to keep up with I did like the interaction it provided.	I think this is a hard course to only provide during the summer, we would gain better knowledge if it was an in class fall or spring course.
I also appreciated the incorporation of our questions in the podcast because I felt like we were being heard.	
The podcast were helpful because I could listen and take notes.	
I really enjoyed the different mediums used in this class.	
The podcasts and video lectures were AWESOME. I also enjoyed participating in discussions with my Peers through Flipgrid.	
I really do the like the podcasts.	
I think that was a neat and interesting way to get information across.	
I also enjoyed a new forum to learn material rather than a simple PowerPoint.	
I enjoyed the podcasts.	

IV. DISCUSSION

The purpose of this study was to examine the use of podcasts in a graduate class, specifically exploring the areas of motivation, perception and acquiring the information. One key consideration about the use of a specific technology is that one must consider several elements such as age and prior use.

It is important to consider age when examining the use of technology. Czaja et al. [6] have shown that older adults are less likely to be comfortable and use new technologies than younger adults. The participants in this study ranged in age from 22 to 47 years old. The majority were females in their mid-twenties. Over half of the group used podcasts frequently for education or entertainment. However, almost a quarter of them did not use podcasts at all. This would suggest that about

half would be more comfortable with podcasts, and that over half of them would feel a bit more apprehensive. This is supported when examining the item in the confidence scale that dealt with the first impression of podcasts. Before the semester starts, there is always some anxiety about the difficulty of the course. This may have been heightened by the novelty of podcasting (“When I first listened to the podcasts, I had the impression the lesson would be easy for me.”). This was the lowest item on the entire scale with a mean of 2.8 (1-5). However, on the pre-survey questions, the students were very optimistic. They endorsed that podcasting would be an interesting, convenient method for increasing their learning. It seems that this continued throughout the semester and was even slightly higher at the end of the course (4.3 to 4.5). The anxiety that may have been present at the beginning of the course seemed to be alleviated as the semester continued. The comments at the end of the course support that the students believed they acquired the needed information. Some examples are “The use of podcasts were amazing”, “I also enjoyed a new forum to learn material rather than a simple PowerPoint”, and “The podcasts were helpful, because I could listen and take notes”.

Familiarity and comfort with using podcasts should be considered when planning to use podcasts in a course. In this study, almost a quarter of the participants had not used podcasts and almost none of them had used podcasts for information in the subject area. This is not an unusual finding. Over half (51%) of [9] participants were unfamiliar with podcasting before their study. Likewise, [31] found that 44% of their participants had not used podcasts. To alleviate this anxiety associated with lack of familiarity, clear directions for access and use of the technology may be helpful. Using an example not associated with graded material may also be useful.

A key purpose of this study was to determine if podcasts can be used to deliver information in a graduate class in way that the students are motivated, they perceive them as positive and successful in acquiring the information. Based on the findings, the students were motivated by the use of the podcasts as a method of instruction. The class averaged a score of 149 out of a total possible 180 points. All of the subscales are above a 4 (1-5) except the satisfaction scale which was at a 3.8. These findings are in line with similar studies looking at podcasts and student motivation with different grade levels and topics [29]. It would seem that using podcasts as a primary or secondary method of instruction may help to keep the students motivated.

A podcast may be perceived as a convenient way to acquire the needed information given the amount of work that is expected of graduate students. This is supported by prior research showing that when the education activities are portable, they are viewed as more accessible and convenient [8]. Students also prefer to choose their own methods and deadline, although the outcome of the tasks seem to be mixed between positive and negative [3]. One possibility suggested is that successful students, like graduate students, are able to choose better schedules for themselves [3]. This could help to

explain the current findings given that in this study all participants were graduate students.

Examining student learning is limited in this study. The final exam grades and final course grades were used to examine learning. It would need to be assumed that the exam and course grade assessed the important knowledge and skills for this area. If it is accepted that these do reflect the important concepts, then it appears that students did as well with the materials as face-to-face classes in the past, with an average of high B to low A. While not improving learning, it can be said that the methods are equivalent in student learning. Other studies suggest that podcasting may be able to improve student learning. Reference [26] indicated that podcasts increased student motivation, engagement, and improved learning. Others have found that when student use podcast repeatedly their performance increases over those that are just exposed to a lecture [21].

A second purpose of this study was to determine what was the perception of podcasts as an instructional method with graduate students. Based on the student ratings and ratings of instruction, it is believed that students perceive podcasting as an instructional method in a very positive way. The comments from the students were overwhelmingly positive as were the ratings of instruction. Other studies have had similar results. Many students in [9] reported that they hoped podcast would be used more, and some even indicated that they hoped it could replace more traditional methods of instruction. One study indicated that students they believe podcast helped them learn more than face-to-face classes [32].

There are several limitations to the study. It is a relatively small sample size with a skewed sample of almost all mid-twenty females in graduate school. Any generalization should be done with caution. In addition, this was a survey study and only examined perceptions of the podcasts. In future studies, it would be helpful to have more detailed measures of information acquisition so that true learning can be compared with different instructional techniques.

In conclusion, it seems that podcasting may be a useful instructional tool for instructors. It can be used as a valuable additional resource for students, as supplemental materials, or even as a replacement for some more traditional techniques. Using a convenient, exciting technology can enhance any course. However, considerations of time, energy, resources, and support must be considered. Additional studies comparing podcasting and different instructional techniques are necessary to further explore the utility and effectiveness.

REFERENCES

- [1] Abate, K. S. (2013). The effect of podcast lectures on nursing students' knowledge retention and application. *Nursing Education and Perspectives*, 3(34), 182-185.
- [2] Acharya, C. (2003). NUSCast survey. Paper presented at the conference on human factors in computing systems, Montreal, Canada. https://team.nus.edu.sg/cdtl/staff/Research/CDTLMSNo_4.pdf.
- [3] Ariely, D., & Wertenbroch, K. (2002). Procrastination, deadlines, and performance: self-control by precommitment. *Psychological Science*, 13(3), 219-224.
- [4] Brittain, S., Glowacki, P., Ittersum, J. V., & Johnson, L. (2006). Podcasting lectures. *Educause Quarterly*, 3.

- <http://connect.educause.edu/Library/EDUCAUSE+Quarterly/PodcastingLectures/39987>.
- [5] Chin, A., Helman, A., & Chan, T. M. (2017). Podcast use in undergraduate medical education. *Cureus*, 9(12), e1930.
- [6] Czaja, S. J., Charness, N., Fisk, A. D., Hertzog, C., Nair, S. N., Rogers, W. A., & Sharit, J. (2006). Factors predicting the use of technology: Findings from the center for research and education on aging and technology enhancement (create). *Psychology and Aging*, 21(2), 333–352. <https://doi.org/10.1037/0882-7974.21.2.333>
- [7] Duffy, T. M., Lowyck, J. & Jonassen, D. H. (1993). *Designing environments for constructivist learning*. Springer.
- [8] Evans, C. (2008). The effectiveness of m-learning in the form of podcast revision lectures in higher education. *Computers & Education*, 50(2), 491-498.
- [9] Fernandez, V., Simo, J. M., & Sallan, (2009). Podcasting: A new technological tool to facilitate good practice in higher education. *Computers & Education*, 53(2), 385-392.
- [10] Green, M., & Sulbaran, T. (2006). Motivation assessment instruct for virtual reality scheduling simulator. In T. Reeves, & S. Yamashita (Eds.), *Proceedings of world conference on e-learning in corporate, government, healthcare, and higher education 2006* (pp. 45-50. Chesapeake, VA: AACE
- [11] Harley, D., Henke, J., Lawrence, S., McMartin, F., Maher, M., Gawlik, M., et al. (2003). Costs, culture, and complexity: An analysis of technology enhancements in a large lecture course at UC Berkeley. <http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1003&context=csh>
- [12] Huntsberger, M., & Chan, T. M. (2007). The new “pedagogy” incorporating podcasting into journalism education. *Journalism and Mass Communication Educator*, 61(4), 397-410.
- [13] Jeamu, L., Kim, Y., & Lee, Y. (2008). A web-based program to motivate underachievers learning number sense. *International Journal of Instructional Media*, 35(2), 185-194.
- [14] Keller, J. M. (1987). Development and use of the ARCS model of motivational design. *Journal of Instructional Development*, 10(3), 2-10.
- [15] Keller, J. M. (2008). First principles of motivation to learn and e-learning. *Distance Education*, 29(2), 175-185. doi: 10.1080/01587910802154970.
- [16] Keller, J. M. & Suzuki, K. (2004). Learning motivation and e-learning design: A multinationally validated process. *Journal of Educational Media*, 29(3), 229-239. doi: 10.1080/1358t65042000283084.
- [17] Lee, M. J. W., & Chan, A. (2007). Reducing the effects of isolation and promoting inclusivity for distance learners through podcasting. *Turkish Online Journal of Distance Education*, 8(1), 85-104.
- [18] Loorbach, N., Peters, O., Karreman, J., & Steehouder, M. (2015). Validation of the Instructional Materials Motivation Survey (IMMS) in a self-directed instructional setting aimed at working with technology. *British Journal of Educational Technology*, 46(1), 204-218. doi: 10.1111/bjet.12138
- [19] Maag, M. (2006). Podcasting and MP3 players: Emerging education technologies. *Computers, Informatics, Nursing*, 24(1), 9–13. doi:10.1097/00024665-200601000-00005.
- [20] Mayer, R. E. (2003). The promise of multimedia learning: Using the same instructional design methods across different media. *Learning and Instruction*, 13(2), 125-139.
- [21] McKinney, D., Dyck, J. L., & Luber, E. S. (2009). iTunes University and the classroom: Can podcasts replace professors? *Computers & Education*, 52(3), 617-623.
- [22] Merhi, M. I. (2015). Factors influencing higher education students to adopt podcast: An empirical study. *Computers & Education*, 83, 32-43.
- [23] Mirriahi, N., & Alonzo, D. (2015). Shedding light on students’ technology preferences: Implications for academic development. *Journal of University Teaching and Learning Practice*, 12(1).
- [24] Mitchell, L. (2006, October 30). iPods cast a wide net for learning. *The Age*. <http://www.theage.com.au/news/education-news/ipods-cast-a-wide-net-for-learning/2006/10/27/1161749321278.html>.
- [25] Ng’ambi, D., & Lombe, A. (2012). Using podcasting to facilitate student learning: A constructivist perspective. *Educational Technology & Society*, 15(4), 181-192.
- [26] Oliver, B. (2005). Mobile blogging, ‘Skyping’ and podcasting: Targeting undergraduates’ communication skills in transnational learning contexts. *Microlearning*, 107 (4), 587-600.
- [27] Powell, C. B., & Mason, D. S. (2013). Effectiveness of podcasts delivered on mobile devices as a support for student learning during general chemistry laboratories. *Journal of Science and Technology*, 22, 148-170.
- [28] Reynolds, P. A., & Mason, R. (2002). On-line video media for continuing professional development in dentistry. *Computers & Education*, 39(1), 65–98. doi:10.1016/S0360-1315(02)00026-X.
- [29] Rockhill, C., Pastore, D., & Johnston, D. (2019). The effectiveness of podcasts in sport management education. *Journal of Hospitality, Leisure, Sport & Tourism Education*, 25, 1–7. doi:10.1016/j.jhlste.2019.100211
- [30] Rogers, D. L., & Withrow-Thorton, B. J. (2005). The effect of instructional media on learner motivation. *International Journal of Instructional Media*, 32(4), 333-340.
- [31] Shim, J. P., Shropshire, J., Park, S., Harris, H., & Campbell, N. (2008). Podcasting for e-learning, communication, and delivery. *Industrial Management and Data Systems*, 107(4), 587-600.
- [32] Traphagan, T., Kucsera, J. V., & Kishi, K. (2010). Impact of class lecture webcasting on attendance and learning. *Educational Technology Research and Development*, 58, 19–37.
- [33] Zvacek, S. M. (1991). Effective affective design for distance education, *Tech Trends*, 36(1), 40-43.