GENERAL

Development and Assessment Strategies of Educational Entertainment Media for Learner-Centered Instruction in Higher Education

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Advances in technology provide students with unprecedented access to media and entertainment. In an effort to transition to a learner-centered approach to instruction, higher-education institutions are using educational entertainment media, or edutainment, to engage students in problem-solving and higher orders of thinking. This article reviews six principles in designing edutainment media and strategies for assessment. Edutainment program examples used in institutions and their assessments are provided.

Recent advances in technology have allowed the American population greater access to media and entertainment. Media is defined as the "main means of mass communication (broadcasting, publishing, and the Internet) regarded collectively" (Lexico U.S. Dictionary, n.d.). New media outlets have created the opportunity to expand communication to a broader audience in a variety of ways, from the invention of film and television in the early 1900s to the prevalence of blogs and social media sites in the 2000s. For example, more than three-quarters of the U.S. population went to the movies at least once in 2017 (Motion Picture Association of America, 2017). According to the MPAA (2017), young adults are the most consistent movie-goers. Audiences between ages 12 and 17 watched an average of 4.9 movies in 2017, the highest of any age group, closely followed by audiences ages 18 through 24. Interestingly, audiences from Latino and Asian backgrounds represented the highest movie-going population that year (MPAA, 2017). Additionally, Americans now spend 49% of their media time on a digital platform (MPAA, 2017).

These statistics demonstrate that media, particularly digital media, is increasingly utilized by the same populations that higher education institutions strive to support. Although high-school age students transitioning to college, college-age students, and minority populations are frequently targeted with resources to help them excel at the university level, repeated exposure to external media for entertainment can also serve as a powerful educational tool for these target groups. Lessons learned from movies, television shows, and social media can sometimes prove difficult to counter with traditional programs found in universities, especially when lessons from media may conflict with traditional program teachings (Cann, 2015; Reynolds, 2014; Tisdell, 2008; Wells & Serman, 1998).

Newer generations of students entering higher education have greater access to media, both through newly-available physical devices (e.g., smart phones, tablets, e-book readers) and through increased sources of digital content (e.g.,

e-books, movie-streaming apps, viral media or *memes*, social networks). As media can serve as a powerful educator, student learning is possible while using it as a tool, even if learning occurs at a subliminal level. Some students may also find the various disseminated forms of information easier to retain, since some media outlets can be more learning conducive than others due to individual learning preferences. As a result, more educational institutions are transitioning toward a learner-centered approach to instruction by using media to create engaging and personalized programs for students. For example, teachers in elementary education have been using video games and television shows to teach children important low-level concepts in school, such as math drills and typing proficiency (Becker et al., 1999; Duque et al., 2008; Jarvin, 2015; Jensen et al., 2016; Marinelli & Pausch, 2004; Rice, 2007). However, use of educational entertainment, colloquially called *edutainment* in literature, has only recently been seen in higher education. In the last decade, educators used edutainment media to supplement traditional learning both inside and outside of the classroom (Cirigliano, 2012; Newcomb & Riddlesperger, 2007; Souto-Manning, 2011; Tisdell, 2008).

While the use of media as an educational tool is gaining strong interest internationally, the United States has been slower to implement such programs. This could be due to institutional barriers such as academic culture, shared governance, and levels of bureaucracy that can slow down large-scale changes (Schejbal, 2013). A review of the literature on edutainment media suggests that these programs have seen more success in institutions outside of the United States. (Alves et al., 2019; Caroline & Srirejeki, 2019; Cirigliano, 2012; Incerti et al., 2018; Pappas-DeLuca et al., 2008; Piotrow, 1994; Qiongping & Harncharnchai, 2018; Yusoff & Sato, 2019). Research on educational entertainment programs in American higher education is sparse and relatively recent, suggesting an emerging field of research. The increased interest in edutainment media as a pedagogical tool in higher education institutions highlights a transformational shift towards a learner-centered approach to education (Pedersen & Liu, 2003; Smart et al., 2012). This article provides an analysis of current research to highlight educational entertainment programs being implemented in higher education institutions. The programs are then further analyzed using instructional design principles for program development and assessment. The goal of this analysis is to see what design principles, if any, are being used by higher education institutions in the development of these programs.

Media and Education

Media consumption has proven popular in modern society, both influencing and influenced by culture. Media research suggests that there is a link between media and perceptions of the world (Lillard et al., 2015; Senthilkumar & Venkatesh, 2017; Williams, 1986), making it important to understand what media is teaching consumers and how they are learning from it. The role of media and popular culture in education is discussed largely

among critical media literacy scholars in the K–12 arena, along with a plethora of information available on media's effects on children (Tisdell, 2008), but there is little information on media's effects on university students.

Media Defined

Media can take many forms, and can be used to describe different types of communication and information dissemination. The online resource Dictionary.com defines media as "the means of communication, such as radio and television, newspapers, magazines, and the Internet, that reach or influence people widely" (Dictionary.com, n.d.). Other sources, however, provide more detail on what constitutes media. Media as a whole can be divided into two major categories: traditional media and new media (Marbella International University Centre, 2017; Thoughtful Learning, 2014). Figure 1 depicts the breakdown of these media types. Traditional media is further broken down into two subtypes: broadcast media and print media. Broadcast media includes television, movies, radio, and music. Print media includes books, newspapers, magazines, signs, and billboards. Both types of traditional media share some common traits. They generally consist of one-way communication from the source to the audience; the audience acts as a passive recipient to the information presented by the media outlet. Traditional media creation also typically has higher barriers to entry. One would need a newspaper press to create a newspaper, for example, or a publishing company to publish a book. A movie or TV studio is required to create movies and TV shows, just as a radio tower is needed to broadcast radio programs.

Advances in technology introduced a second category of media: new media. Examples of new media include websites, blogs, podcasts, video games, emails, social networks, and video streaming. More digital in nature, this type of media has a few unique characteristics that differentiate it from traditional media. Unlike traditional media's one-way communication, new media has an added layer of interactivity with the audience. The audience can respond to, or even influence, the new media. This can involve people commenting on a blog post or podcast, playing a video game, sending an email, rating a movie they streamed, or creating content for a social network or blog.

Notably with media, it is often described using two perspectives: the media content and the device or source through which the content is delivered. For instance, when describing television as a type of broadcast media, one clarifies whether they are describing the physical television set turned on or rather the television program shown on the television set. Similarly, the video game medium could be the console, or the game that is played on the console. New media makes these distinctions even less clear, as content can be accessed through a variety of different sources. For example, video streaming can be viewed through computers, television sets, or smart phones. When educational institutions create new media for educational purposes, the focus is usually on content and not on the physical media device. The content is fitted to already existing media devices.

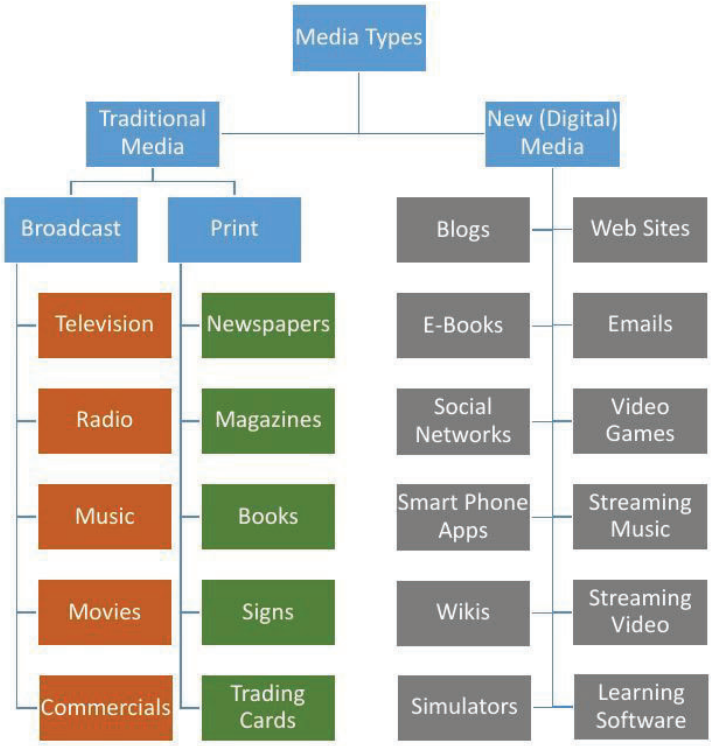

Figure 1: Types of media as defined by Thoughtful Learning (2014)

Media as a Pedagogical Tool

Higher education's increasing use of media to educate is based on a few theoretical principles about the pedagogical value of media, as they are useful in explaining why consumers of media tend to learn and retain information more easily than with traditional methods of teaching. Mere repeated exposure theory, originally developed by Zajonc (1968) for consumer and market research, suggests that repeated viewing of any particular stimulus, such as stimuli found in media, enhances a positive attitude toward that stimulus. Repeated exposure to media improves recognition. This recognition, whether correct or mistaken, enhances the likelihood of preference toward whatever is shown (Harmon-Jones & Allen, 2001; Stafford & Grimes, 2012). To illustrate this point further, one can look at university fiction and its impact on college students who consume it. Between the 1970s and 1980s, several college-themed movies were released that placed strong emphasis on unsafe university behaviors, such as excessive partying, binge drinking, and substance abuse (Reynolds, 2014; Wasylkiw & Currie, 2012). Under mere repeated exposure theory, students who watch a number of these movies may subconsciously develop preferences toward involvement in activities depicted in these films. For example, Wasylkiw and Currie (2012) found that students who watched the movie *Animal House* were more likely to have positive attitudes towards binge drinking and partying in college.

In addition to developing preferences resulting from stimuli shown by media, the consumer is also likely to attach preferences to other stimuli exhibiting similar characteristics as previous stimuli (Kwan et al., 2015; Zajonc, 2001). This means that students could take the representation of a university in one movie and generalize it to all universities unrelated to the movie. In a recent study, students were asked if university movies, TV shows, and novels influenced their perceptions of university life (Nuñez, 2018). Students consuming large amounts of university media were more likely to deny that media influenced their perceptions. However, the same high consumers of media were more likely to have positive attitudes toward socializing and partying in college, suggesting that their attitudes were related to the amount of media consumption. Even though participants did not believe their attitudes were influenced by the media they consumed, the study suggested that the media may have had a subconscious effect on them. A follow-up study, where high school students consumed three different types of university media, also found students were likely to associate their own college perceptions to what they saw in the media (Nuñez, 2019).

Once these perceptions are developed, it is difficult to change them with traditional education methods. Mere repeated exposure theory indicates that stimuli exposure without awareness produces substantially larger exposure effects than stimuli that are consciously perceived (Bornstein & D'Agostino, 1992). This suggests that traditional, institutional, lecture-based programs that educate students may have a difficult time competing with the subconscious lessons learned from media consumption.

Increased media use in education also requires a stronger focus on student-centered learning. Learner-centered instruction (i.e. student-centered learning) differs from traditional instructional approaches since students play a more active role in their education (Pedersen & Liu, 2003). This is conducted through tailored activities that emphasize complex problem solving and higher-order thinking skills (Polly & Hannafin, 2010). Traditional instructional methods where professors pass along information to students may be limited by one-way communication. The student is then limited to lower-level orders of thinking, such as recollection and understanding. Comparatively, higher-level orders of thinking (i.e. analysis and synthesis) take place when students engage in activities that help them process information more thoroughly. Traditionally, this is done with homework assignments and assessments (i.e. quizzes and tests). In a learner-centered approach, however, both lower and higher level orders of thinking are accomplished simultaneously through competence-based activities that require students to solve problems or complete objectives. Media use (facilitated through increasingly affordable and user-friendly technology) allows instructors to have additional options when creating learner-centered activities for students. Instructors can also capitalize on media's ability to personalize a student's learning based on individual preferences and learning ability. For instance, five criteria of personalized learning used in learner-centered schools are personalized learning plans,

competency-based student progress, criterion-referenced assessment, problem- or project-based learning, and multiyear mentoring (D. Lee et al., 2018). Media-based instruction can meet several of these criteria simultaneously, since educators have the flexibility to create different activities, often at minimal or no cost, while meeting a student's learning needs.

Educational Entertainment

Earlier descriptions of media categorize it as either traditional media or new media, both of which are based on type of technology used, its interactive element with the audience, and its delivery speed. However, for learning pedagogy purposes, this description of media is still too broad. Educators wishing to use media in the classroom will need additional guidance on what type of media to use and how to create the necessary media content if the required media is unavailable. This involves viewing media from a different lens.

Brian Tracy, a personal development author, makes a distinction between people who achieve and do not achieve personal growth through the Entertainment vs. Education (EvE) Ratio (Sanders, 2013). The principle behind the EvE ratio is that people will generally choose to spend their day engaged in activities that either entertain or educate. Thus, to facilitate learning and increase personal growth, one must reduce their entertainment activities and increase educational pursuits to balance the ratio in favor of education. According to Tracy, however, the average person spends 50 minutes on entertainment for every one minute spent on education. Although the validity of his claim is uncertain, it does provide an alternative lens through which to view media. Instead of focusing on the technical aspects of different media types, we can classify media's purpose to create distinguishable categories. For instance, some media is created for the purpose of entertainment. Hollywood movies, music albums, and video games are created with the primary purpose of entertaining audiences. News stories, email threads, documentaries, and commercials are used to educate people on certain topics. Historically, students made choices between engaging in entertainment-related activities (e.g., watching television or playing video games) or education-related activities (e.g., doing homework or studying for a test). Technological advances, however, created media methods that blend these two mutually-exclusive concepts together to form a continuum, or ratio, of its own. This has allowed the creation of educational entertainment media, or *edutainment* media, seen in schools today.

To increase student engagement and participation as well as facilitate learner-centered instruction, educators and other entities have progressively incorporated entertainment into educational activities over time. For example, although lecturing was traditionally the dominant teaching form (Davis, 2011), educators and researchers actually studied alternative educational forms since the 1900s. Historically, the concept of entertainment was seen as essential to a positive human experience, especially if formalized into a structured activity promoting learning (Dewey, 1910). For instance, interest in paper-

based games became increasingly popular among educators in the 1960s (Rice, 2007). Educators believed that games and other fun activities were the most powerful medium for reaching younger learners (Jenkins et al., 2003) because the method helped engage students in interactive learning and enhanced critical thinking, small group discussion, and problem solving skills (Odenweller et al., 1998).

Although educational entertainment is relatively new as a scholarly concept, scholars repeatedly use the term *edutainment* to describe activities, lessons, and programs that provide either entertaining education or educational entertainment (Cirigliano, 2012; Jarvin, 2015; Landt & Prem Sud, 2001; Singhal & Rogers, 2012). The term also applies to simplistic but popular games used by primary schools to teach lower-level thinking skills through repetition via drills (Charsky, 2010). Formally, edutainment is defined as "entertainment (as by games, films, or shows) that is designed to be educational" (Merriam-Webster, n.d.). This means that the content must be *intentionally designed* to be educational.

This definition narrows the scope of what constitutes as edutainment media. Unlike regular media, edutainment media is created or repurposed for the purpose of education. However, the ratio of entertainment to education may vary, as some edutainment forms may focus more on entertainment rather than education. For example, *Microsoft Flight Simulator*, a video game allowing players to fly virtual aircraft using realistic instrumentation, may be more education focused when compared with other simulators, like *The Sims*, which allows players to build their own communities. These examples demonstrate the original purpose for creating these games. For instance, the accuracy of the flight instrument placement and controls of *Microsoft Flight Simulator* makes it a valuable teaching resource for prospective pilots (Koonce & Bramble Jr., 1998). Adversely, the lack of actual objectives and technical limitations of *The Sims* make the game less useful as an educational resource (however, it is worth noting that other series variations, such as *SimCity* have had successful use in classrooms) (Minnery & Searle, 2014). The distinction between the two games, as in the flight simulator case, is the intentional design of accurately portraying aircraft control, qualifying it as a form of edutainment media useful for training purposes.

Educational Entertainment in the Learner-Centered Classroom

Recent research shows how edutainment media can educate students and promote social change (Cotwright et al., 2017; Igartua & Vega Casanova, 2016; Obregon & Tufte, 2014). In general conceptualization terms, edutainment has been used as a historical teaching tool across several fields and disciplines, with evidence of its earliest use in dramatic arts to teach moral lessons in ancient Greece (Piotrow, 1994). Overall, its use through media has rapidly increased in recent decades largely due to technological advancements. For example, children's television programming became a useful tool in aiding children's development, while encouraging educationally appropriate activities like reading (Jensen et al., 2016). First developed in the 1960s, educational

television revolutionized the edutainment industry with shows, such as *Sesame Street,* teaching students different concepts using music and puppets (Jarvin, 2015). Since that time, edutainment continues to move further into and outside the classroom. Short films educating Nigerian communities on HIV (Pappas-DeLuca et al., 2008), educational card games teaching health sciences (Odenweller et al., 1998), theatre games helping preservice teachers develop more multicultural sensitivity (Souto-Manning, 2011), soap operas teaching specific social learning concepts (Piotrow, 1994), and improvisational theater teaching social and critical thinking skills (Newcomb & Riddlesperger, 2007) are all clear examples of edutainment's growth and usefulness.

Media, much like education, focuses on the dissemination and communication of information between people, making both fields compatible for merging and innovating (Marinelli & Pausch, 2004). For instance, as a heavily studied use of educational technology, video games are commonly used in classrooms (Marinelli & Pausch, 2004). As the worldwide population spends over a billion hours a week playing video games (McGonigal, 2011), this explains recent interest in incorporating video games specifically into teaching curricula. Popular video games such as *Oregon Trail*, *SimCity*, and *Math Blaster* are used in classrooms as educational supplements (Duque et al., 2008; Rice, 2007). *Math Blaster*, the most commonly used title in American classrooms, has sold several million copies under various titles (Becker et al., 1999). The game's narrative involves defeating enemies by correctly answering math problems. Although simplistic, the game manages to increase student and teacher motivation to work through the required repetition involved in math drills (J. Lee et al., 2004). This demonstrates that the entertainment factor of an activity often facilitates motivation needed to complete it, even when activity completion results in minimal to intangible end products or results (Rafferty & Vander Ven, 2014). As long as an individual finds the process enjoyable, the purpose or the end reward for completing it is less important.

Critics of video game edutainment suggest that video games only address the lower levels of learning according to Bloom's Taxonomy (Bloom et al., 1956). The six levels of Bloom's Taxonomy, in increasing order, are: knowledge, comprehension, application, analysis, synthesis, and evaluation. Games, such as *Math Blaster*, are limited, since they only address the knowledge and comprehension levels of thinking. However, simulation games, such as *SimCity*, allow players to design entire cities through minute decisions, possibly developing higher level thinking skills, such as application.

It becomes imperative when designing edutainment media for classroom use that educators ensure that the technology used facilitates problem solving and user interactivity (Polly & Hannafin, 2010). This technology can be as complex as a fully immersive simulator to as simple as a printed card game. Although the former is considered new media and the latter traditional media, both are considered educational entertainment when designed for that purpose.

In order to distinguish if the form of edutainment media is purposely designed for problem solving and active participation, one can use Polly and Hannafin's (2010) six principles for educators to follow when designing learner-centered activities using technology: (1) focus on student learning, (2) maintain ownership of content and activities, (3) develop knowledge of content and pedagogies, (4) collaborate with learning communities, (5) maintain ongoing consistency, and (6) reflect on their work. With these principles, educators acting as content experts can create fully developed programs using technology and associated pedagogy more effectively (Polly & Hannafin, 2010).

Educational Entertainment in Higher Education

Although the majority of edutainment research focuses on primary and secondary education, universities are incorporating more edutainment programs to supplement traditional education methods. Cirigliano (2012) used a learner-centered edutainment approach to understand student attitudes toward a graphic novel demonstrating concepts in custom cell biology. The program was a supplement to a more traditional, lecture-based cell biology course. Cirigliano stipulated that "passive exposure to information-enriched entertainment may prove beneficial as a method of making connections, recalling information, enhancing memory, and stimulating interest in academic subjects" (p. 29). Cirigliano asserted that, although it should not be a substitute to traditional education, edutainment is useful in enhancing students' exposure to a particular concept as well as encouraging synthesis and application in other situations since problem solving skills and strategies learned in one type of media can carry over to another (Fisch, 2013).

Cirigliano did apply most, but not all, of Polly and Hannafin's (2010) principles for learner-centered activity development. With the graphic novel's intention of increasing student engagement in his class (1. focus on student learning), Cirigliano, as the instructor of the course and developer of the graphic novel, maintained ownership of the activity (2. maintain ownership of content and activities) while having the necessary content expertise (3. develop knowledge of content and pedagogies). He also displayed reflection of his work through the study by exploring student attitudes on the material (6. reflection). It is unknown, however, whether Cirigliano collaborated with others when developing the graphic novel (4. collaborate with learning communities) or if the activity continued past the first year (5. maintaining ongoing consistency).

In another example, Richard Daley University used a learner-centered edutainment model by partnering with the Associated Equipment Distributers Foundations (AEDF) (4. collaborate with learning communities) to provide construction training for high school students (Landt & Prem Sud, 2001). The program involved combining university-level courses with various volunteering opportunities, mentor activities, hands-on projects along with student incentives in order to motivate students in improving their construction skills (2. maintain ownership of content and activities, and 3. develop knowledge of content and pedagogies). The program targeted students who were neither

the top- nor bottom-performing in their class (i.e., the "average" student). The university found that students in the midpercentile in high school classes were less interested in learning and more interested in entertainment. They selected these students for the program, theorizing that if the students found the curriculum enjoyable, student grades and retention would improve (1. focus on student learning). Utilizing occasional media use with other experiential activities, the semester-long program was implemented with regular feedback received from the students (5. maintain ongoing consistency). The program was considered a success as retention became much higher for program students when compared with those not in the program (6. reflection).

Other universities have also embraced edutainment media through different programs and areas of focus. John Hopkins University focuses on traditional media by having supported over 36 television series and specials, 9 radio dramas, 3 songs, and 9 music videos (Piotrow, 1994). MIT created a Comparative Media Studies program that develops prototype games that teach and develop curricular materials, showing a focus on new media (Jenkins et al., 2003). Professors at the Carnegie Mellon University's Entertainment Technology Center regularly research how to best use interactive technology in education (Marinelli & Pausch, 2004). Regardless of media type used, evidence shows that higher education institutions are noticing edutainment's value.

Assessing Edutainment Media

When implementing an edutainment media program, it is important to assess its effectiveness in practice. Firstly, one must understand *what* is being assessed. In any form of edutainment media, there are three main variables that can be assessed (Table 1). The first two variables are the measures of education and entertainment. Education involves material content being presented to the student and can be operationalized using student outcomes and the student's ability in meeting those outcomes. Comparatively, entertainment involves student engagement with the program or activity and participant attitudes on its presentation. This can be operationalized different ways, depending if conducted quantitatively or qualitatively. The final variable, which is evaluated less often in literature, is the source of content delivery, or media device. As noted previously, media can mean both content and the device used to deliver content. However, the two are not interchangeable and the use of one can affect the other's impact. The first variable measures media content, while the last variable measures media source. When devices are not user friendly, they can inhibit both the student's enjoyment of an activity as well as their ability to learn the intended skills and knowledge. Thus, it is important to understand the quantitative and qualitative research approaches available for assessing edutainment media, which ensure content, audience engagement, media device, or any combination thereof were properly evaluated and executed.

Table 1: Edutainment Assessment Variables

Edutainment measure	Assessment variable	Operationalized variable
Education	Media content	Student/learning outcomes met, retention of information, demonstrate proficiency of skill
Entertainment	Audience engagement	Positive/negative attitudes, behaviors towards activity, length of time engaging in activity
Source	Media device	Technical performance, learning curve (time it takes to learn to operate), associated costs, return on investment

Quantitative assessments. Pappas-DeLuca et al. (2008) found positive associations between exposure to a radio program that promoted HIV prevention and personal attitudes (e.g., stronger intentions to HIV test and partner communication about testing). The assessment focused on content via viewer learning outcomes with some limited assessment on viewer engagement. No assessment of the media device utilized for content presentation (radio program) was conducted. Duque et al. (2008) used pre- and posttests to evaluate the effectiveness of an instructional video game simulating home visits for medical students. Findings indicated high levels of engagement associated with knowledge improvement. The assessment aimed to measure all three aspects of edutainment media to draw a relationship between the effectiveness of the device, student engagement, and student learning outcomes. The study, however, did not focus on certain aspects of device usage, such as associated costs. Hether et al. (2008) surveyed 599 participants who viewed breast cancer-themed episodes of primetime shows *ER* and *Grey's Anatomy*. Results demonstrated extended exposure to the storylines had a significant impact on viewers' knowledge, attitudes, and behaviors related to breast cancer. This was a unique example of researchers using existing media created for noneducational purposes. Although not technically edutainment media (as defined in this article), the results were notable in showing how even regular media can achieve similar results as edutainment media. Even though the content was helpful in achieving desired outcomes regarding breast cancer awareness, it was not necessarily the level of engagement that changed attitudes and behaviors, but the amount of exposure to the episodes. The more themed episodes they saw, the more significant their attitudes changed, reinforcing Zajonc's (1968) mere repeated exposure theory as an element of media's effectiveness. Wasylkiw and Curry's (2012) experimental study discovered that students who watched the movie *Animal House* more likely held positive attitudes toward drinking alcohol and partying excessively, which were prevalent acts in the movie. Once again, researchers used a media form created for noneducational purposes and instead measured it for its edutainment viability. Content exposure altered student attitudes towards the same material when placed in a real-life setting. This shows that once again, although *Animal House* does not fit the traditional definition of edutainment media, even pure entertainment media can correlate with changed attitudes and behaviors.

Qualitative assessments. Lee et al. (2004) investigated whether integrating educational video games into classroom settings could aid learning through a learner-centered design. The goal was development of new technology alongside curriculum in order to create activities with active student participation. Researchers found that not only did students and teachers enjoy using the video games, but students exceeded classroom expectations through their use. This study was unique since it focused not only on all three measures of edutainment media assessment (the combination of media content, media engagement, and the media device) but also on how their interaction aided learning. Newcomb and Riddlesperger (2007) conducted a case study finding the use of improvisational theater effective in teaching genetic concepts to nursing students that was well accepted by these students. The study's primary focus was on student engagement and media content with minimal focus on the device (in this case, the device was not directly media related since it was a live activity requiring no technology). Souto-Manning (2011) also used theatre games to educate White teachers in understanding their own power and privilege, while assessing student engagement in these games.

Odenweller et al. (1998) found students playing a card game based on gastrointestinal physiology were more engaged (entertainment assessment) and found learning its concepts easier (education assessment). The card game was affordable and easy to understand (source assessment). Rafferty and Vander Ven (2014) found edutainment could also teach and reinforce negative attitudes and behaviors such as bullying in social media (education assessment). Based on participants' personal experiences with cyber bullying and online aggression, Rafferty and Vander Ven identified that people would often engage in these acts when exposed to them online and that performing them was enjoyable (entertainment assessment). This study focused on media devices used for bullying, as they provided easier access for those who would later engage in the act (source assessment). Nuñez (2019) also focused on the media source in a study with high school students consuming college media. Students were instructed to watch a college-themed movie, two college-themed television shows, and read one college-themed novel. They compared the different media based on ease of use (source assessment), story engagement (entertainment assessment), and lessons learned about college (education assessment).

Implications for Practice and Further Research

Educators incorporating edutainment media into learner-centered programs must decide whether they will create it or acquire existing edutainment media. The advantages of creating content are more control over the content, engagement opportunities, and device used for content presentation. It is also more cost effective to create something using a limited budget. Polly and Hannafin's (2010) principles for learner-centered activity development should be followed to maximize effectiveness.

Adversely, creating content does require a time commitment, technological proficiency in the preferred media source, and an ability to translate content into an engaging format. Thus, using existing edutainment media may sometimes be easier. The edutainment media market has grown over time, expanding available resources from which to choose. However, these existing options are usually costly and may not include instructions to assess their effectiveness. Some media forms, like math-based video games, come with their own assessment tools to gauge student learning. Whereas other existing media, like educational television shows, may not assess student learning unless associated student workbooks are included. In either case, educators should find ways to assess student engagement with the media content, either through direct observation of student behavior during interaction, or by collecting student feedback afterwards. The media source or device should also be regularly assessed to ensure that benefits outweigh the costs of device use.

It is recommended that future research includes evaluation of additional edutainment media for potential pedagogical value. As institutions create more edutainment media to aid in learner-centered instruction, efforts must be made to assess their impact on student learning, particularly through the content (education), engagement (entertainment), and device used (source). Particular attention should be paid to the media source. Only some studies highlighted focused on the actual device used for edutainment media, instead focusing on content and engagement. It is critical that the device used is suitable for the educator's goals for the program. Activities requiring expensive technology hinders implementation in a university with limited funding. The shelf life of technology also varies, with new technology rendering older models obsolete relatively quickly. Future research should evaluate the effectiveness of different devices used in classrooms based on cost, ease of use, shelf life, and ability to maximize both engagement and content immersion.

Conclusion

As more institutions adopt learner-centered approaches to instruction, edutainment media may see increased use globally. However, in order to bolster and not hinder learner-centered instruction, edutainment media must be intentionally designed to meet educator goals for both content delivery and student engagement. The six principles described to aid educators in the development of edutainment media, followed by assessment strategies of the finished product, should be adhered to. The utility of edutainment media is only limited by the creativity of those willing to create it. Care must be taken to ensure programs contain substantive pedagogical value and that learning objectives are met.

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