Using Nudge Theory in Hybrid and Blended Course Design Best Practices for Higher Education

Jilane Richardson

Department of Educational Technology, Boise State University

October 19, 2022

Abstract

Hybrid and blended courses are modalities that are being used more often. Because of the format of less face-to-face time, it is imperative that instructors deliver the content to students in the most effective way possible. In order to accomplish this, hybrid and blended course design best practices need to be identified. Course design best practices are key to creating courses that students can easily navigate, allowing them to focus on learning the content, not finding the content. Courses need clear organization and consistent structure. Instructors and instructional designers also need to design courses with community-creating interactions in mind. Instructors need to provide clear instructions with course resources. They need to provide those resources in multiple formats. While designing courses, the instructor can use choice architecture to nudge students toward learning. This concept comes from the nudge theory. Choice architecture is the term for the design of different ways a choice can be presented to the decision maker. The nudge theory is using encouragement or suggestions for others to make a better choice while still leaving all options open. The current educational uses of the nudge theory include sending reminders to students and breaking complex assignments into more manageable parts.

Keywords: Nudge Theory, hybrid courses, blended courses, course design best practices

Using Nudge Theory in Hybrid and Blended Course Design Best Practices for Higher Education

An effective learning experience for students in a course is one of the highest priorities for instructors. Hybrid and blended courses must deliver high-quality materials through a learning management system (Graham et al., 2017). Because of this, good course structure and design are essential for student success (Engelen et al., 2018). A clear course organization helps guide students through the course (Saichaie, 2020). With a clear and consistent structure, students know where to go next (Semunich et al., 2015; Westover & Westover, 2014). This structure allows students to focus on the instructional content rather than decipher the puzzle of how to get to the materials and what to do once there (Ralston-Berg & Braatz, 2021). Hybrid and blended course design best practices can assist instructors and instructional designers construct courses to guide students better.

Course design best practices can be paired with the nudge theory. Economists Thaler and Sunstein (2008) introduced the nudge theory. Initially, the idea was to nudge people to make better financial decisions based on how options were presented to them. Designing those presentations is called choice architecture (Thaler & Sunstein, 2008). Nudging students to select options through the approach of the course structure may reduce cognitive load (Weijers et al., 2021).

Nudge theory in education is a newer field of study (Weijers, de Koning, & Paas, 2021, p. 896). Therefore, it is necessary to identify how instructional designers and instructors can best use nudging in higher education. The concept of choice architecture within the framework of the course structure should be explored. It will be necessary to understand how educators use nudges in courses. The different course designs for hybrid and blended are also essential to understanding and discovering how to use nudges within the best practice framework for course design.

This literature review aims to define hybrid and blended courses, explore the best practices of course design, and examine how nudge theory can be applied in hybrid and blended course design. The following research questions guided this literature review.

1. What are the best practices for higher education in hybrid and blended course design?
    a. What are the definitions of hybrid and blended courses?
    b. What are the differences in course designs for courses with varying percentages of face-to-face versus online courses?
2. How is nudge theory used in hybrid and blended course designs?
    a. What is the history of the nudge theory?
    b. How is nudge theory defined in an educational setting?
    c. How can course designs nudge students in hybrid and blended courses?

This literature review will follow this outline in its organization.

The keywords that were used in the search for information were hybrid course organization, hybrid course design, hybrid course navigation, hybrid course design best practices, blended course organization, blended course design, blended course navigation, blended course design best practices, hybrid versus blended, choice architecture in education, nudge theory in education, LMS course structure best practices, LMS course nudge best practices, nudge theory course structure, and nudge theory course navigation education. The search keywords were entered into four databases, Academic Search Premier, Education Research Complete, ERIC, and PsychINFO. Google Scholar was used to help in the search to obtain papers found in the other databases. ConnectedPapers.com was used to ensure that no vital research had been missed. The years used in the search for hybrid and blended courses were from 2012 to the present. This range was selected in order to maintain the findings' relevance. The range of years used in the search for the nudge theory was set from 2008 to the present, since 2008 was when the theory became recognized through the publication of Thaler

and Sunstein's (2008) book. Most of literature that was collected from the search engines were empirical studies. Some theoretical pieces on nudge theory were included in order to learn more about what this theory entails. All literature reviewed came from peer-evaluated sources or personal interviews. While reading the literature, four cited articles had an importance on the topic that fell outside of the date range. These articles were included in the research because of their importance.

The research was analyzed and coded. The themes that came from the research are elements of course structure best practices, course evaluation, hybrid versus blended courses, learning management tools, and nudge theory.

Hybrid and Blended Course Designs

Traditionally, education has taken place in a brick-and-mortar setting. However, distance learning, that is, learning conducted through correspondence, has been happening since the early 1700s (Anglia Ruskin University, n.d.; Pappas, 2015), although the phrase, distance learning, was not coined until 1840 by Sir Isaac Pitman (Matthews, 1999). With the advancement of technology, distance learning has become more accessible. According to Anglia Ruskin University (n.d.), the term eLearning was first used in 1999. As a result, there is now a myriad of ways that education is being delivered worldwide.

Hybrid or blended courses are one of the many ways education is delivered. This section will explore the definition of hybrid and blended courses, will consider course designs for the different hybrid/blended variations, and will discuss hybrid and blended course design best practices.

Definitions of Hybrid and Blended Courses

When discussing courses with a face-to-face element and an online element, the terms hybrid and blended are often used interchangeably. Other words that mean the same thing are web-assisted and web-enhanced (Hall & Villareal, 2015; Lei & Lei, 2019; Pilcher, 2017). In the introduction of her book, Glazer (2012) states that blended learning is a combination of

synchronous (classes that take place with students and teachers meeting together at the same time) and asynchronous (students accessing materials at different times from different places) approaches. According to Glazer, this creates a superior learning experience compared to traditional classroom settings.

Traditional classes tend to be more instructor-centered (Linder, 2017; Saichaie, 2020). Through hybrid and blended courses, instructors can “create a variety of learning environments for students” (Linder, 2017, p. 11). Class time expectations change through hybrid and blended courses (Saichaie, 2020). Instructors can purposefully include technology to enhance learning and target various learning propensities. According to Linder (2017), hybrid and blended courses have the same primary goal as traditional courses: to help students learn. Students’ curiosity and engagement can increase by incorporating online resources into face-to-face classes. This increased curiosity can motivate students to dig deeper into the content area.

Barbour and Kennedy (2014) offer their definitions of hybrid and blended courses. A hybrid course is a fully online course that has a face-to-face element. This type of course may be achieved through meeting in person once a week, while the rest of the course is asynchronous through online channels. Another format may be a virtual meeting where students get online to meet synchronously using software such as Zoom or Google Hangouts. Barbour and Kennedy (2014) define blended learning as students in a physical classroom participating in online learning activities while in that classroom. An example of this could be students working on exercises on the computer through Kahn Academy during class time. In a hybrid class, students have the advantages of the internet, digital libraries, electronic databases, a live instructor's guidance, and a peer group's socialization (Karoğlu et al., 2014; Kleinpeter, 2017; Lei & Lei, 2019).

McGee (2014) presents a slightly different explanation of hybrid and blended courses. In a hybrid course, students participate in learning activities in a class setting (synchronous). They also participate in learning activities online (asynchronous). However, these activities are

stand-alone. In a blended course, students participate in learning activities in a synchronous class setting and an asynchronous online setting. These activities are designed to correlate and support each other. Activities in the classroom are referred to and used in activities online, and vice versa, thereby creating a loop of learning (Epps et al., 2020; McGee, 2014; Sadaf et al., 2019).

Pilcher (2017) explains that the difference between a hybrid or blended course and a traditional face-to-face course is that students and instructors meet less frequently, allowing the students the flexibility to learn at their own pace using online exercises. He describes how hybrid or blended courses differ from fully online courses, as hybrid or blended courses have the advantage of face-to-face interactions and online exercises. The hybrid or blended course model also provides instructional activities in different approaches to appeal to various learning preferences (Hall & Villareal, 2015; Marquis & Ghosh, 2017; Sorgenfrei & Smolnik, 2016).

Al Najdi (2014) takes the definition of hybrid learning further. Hybrid learning requires time management efficiency to deliver instruction both synchronously and asynchronously. Al Najdi claims that hybrid learning has changed how education has been structured with intelligent teaching systems that can individualize learning for many students' different abilities. Hybrid learning has also made lifelong learning an attainable aim more than ever before (Al Najdi, 2014; Pal et al., 2020).

Ross and Rosenbloom (2011) specify that a hybrid course design completely assimilates online activities and resources with face-to-face teaching to create a supportive pedagogical whole. Young (2014) then takes this hybrid meaning to describe the benefits of a hybrid course: constant access to materials, student control of the learning environment, including time and location, immediate student feedback, individualized learning, and multiple media resources (Hall & Villareal, 2015; Kleinpeter, 2017). In addition, numerous online and in-person venues, which are allowed with hybrid courses, augment concepts (Lei & Lei, 2019; Shand & Glassett Farrelly, 2017; Young, 2014).

Kleinpeter (2017) continues that a hybrid course that is more interactive, engaging, and accessible for students uses the best instructional features of both an online course and a traditional course. This hybrid design allows for more collaboration with peers and instructors by including interaction time (Gedik et al., 2013; Jaggars & Xu, 2016; Kleinpeter, 2017; Sadaf et al., 2019; Shea et al., 2016).

Saichaie (2020) approaches blended, flipped (a variation of blended), and hybrid learning models by explaining their similarities and differences. Blended, flipped, and hybrid learning models have the same three components: expectations, class time use, and technology use. These models also move away from instructor-centered pedagogies, such as lectures, to student-centered pedagogies, such as active learning. Instructors will provide opportunities for students to engage with the content, solve problems, and collaborate to increase exposure to higher-order cognitive processes (Pal et al., 2020; Ralston-Berg & Braatz, 2021; Robinson & Wizer, 2016).

Blended, flipped, and hybrid learning models also have differences (Saichaie, 2020). Blended learning does not replace seat time. The instructor reconsiders the learning process. Flipped learning intentionally transposes what happens in the classroom with what happens outside of the classroom. Hybrid learning intentionally replaces seat time with technology (Saichaie, 2020).

Different institutions may define a face-to-face course, a hybrid or blended course, and a fully online course with a formula. Hybrid and blended courses are often a 50/50 split, with 50 percent of the time in class and 50 percent participating in an online component (Lei & Lei, 2019; Pilcher, 2017). These ratios may vary between institutions (Ealy, 2013). For example, Allen et al. (2007) define the balance as between 30 and 79 percent of instructional content to be delivered online for a hybrid course. Ashland University defines a hybrid course as one that has up to 79 percent of the course online (Ashland University, as cited in Hall & Villareal, 2015).

When considering which activities best suit in-person and online learning, caution should be taken (Ealy, 2017).

Hybrid and blended learning have leverage for students by providing many additional assets such as flexibility, elements of accommodations for students with disabilities, instructor availability, and more personalization for students (Hall & Villareal, 2015; Kleinpeter, 2017; Lei & Lei, 2019; Shand & Glassett Farrelly, 2017; Young, 2014). Lei and Lei gathered insights into the benefits and drawbacks of hybrid and blended learning. The following table is a composite of the pros and cons of hybrid and blended learning, as identified by Lei & Lei (2019).

Table 1

Benefits and Drawbacks of Hybrid and Blended Courses

Benefits of hybrid and blended courses	Drawbacks of hybrid and blended courses
● Best of both online and face-to-face ● Provides an alternative style to learning ● Class schedule flexibility ● Asynchronous communication ● Immediate peer and instructor feedback ● Online posting of assignments for students who have missed ● Group work during class time ● Increase in attendance and participation ● Increase of on-time assignment submission ● Promotes reading and writing skills ● Personalized attention ● Social interaction with peers and instructors ● Less time in classroom ● Savings of travel time and costs ● Increase in student retention ● Increase in student graduation	● Not always a good fit for students ● Students must be self-motivated ● Students struggle with time management and organization ● Students feel a disconnect from peers while online ● Technology issues ● Confusion between class and online sessions ● Students confused with online elements ● Instructor disconnect with non-verbal cues from students ● Time commitment misunderstandings ● Student limits to internet access ● Instructor increase in online monitoring ● Not all students are tech-savvy ● Instructor time commitment to integrate online and classroom components

Note. Adapted from “Evaluating Benefits and Drawbacks of Hybrid Courses: Perspectives of College Instructors,” by S. A. Lei and S. Y Lei, 2019, *Education, 140*(1), pp. 4-6.

It should be noted that these benefits and drawbacks are suggestions from college instructors, not gathered from academic studies.

Within a hybrid and blended course, three elements should be present: online learning activities, which complement the in-person activities, reduced but not eliminated, synchronous class time, and online and in-person instruction designed to blend together (Garrison & Archer, 2000; Shea et al., 2015). Shea et al. (2016) investigated hybrid courses that followed these recommendations. They surveyed 63 students about their performance and satisfaction with the hybrid courses. After analyzing the survey results, the researchers' insight into this design is that technology should not be the driving force behind the activities. Instead, the activities should determine the technology (Baldwin & Ching, 2019; Brown et al., 2022; Saichaie, 2020; Shea et al., 2016).

Karoğlu et al. (2014) highlight the benefits and drawbacks of face-to-face and online learning. Hybrid and blended learning incorporates both benefits of traditional classrooms and online courses to create a better learning environment for students (Karoğlu et al., 2014; Lei & Lei, 2019). In addition, the variety of online experiences can combine with face-to-face socialization, which is essential to successful learning. They caution, however, to ensure that the pedagogy has priority, not the technology (Gleason, 2013; Karoğlu et al., 2014; Shea et al., 2016).

Blackinton (as cited in Kleinpeter, 2017) cautions about the design of hybrid or blended courses. A hybrid approach to a course is not simply adding online materials to a traditional course. Instead, it requires a complete rethinking of the course design to implement both online aspects and classroom learning experiences (Karoğlu et al., 2014; McGee & Reis, 2012; Shand & Glassett Farrelly, 2017).

Hybrid and blended courses are not always suitable for all students (Lei & Lei, 2019; Li et al., 2018; Shea et al., 2015). Students of older generations may not be as familiar with the

required technology. As such, they may become frustrated and lose motivation. Online communication skills may also be a hindrance for older students.

In contrast, digital native learners seem to struggle in traditional classes (Lei & Lei, 2019; Muchsini & Siswandari, 2020). They are afraid to speak out in class to ask questions or respond to questions posed by the instructor. They do not prepare for classes; they do homework later. Using a hybrid or blended approach, digital native learners are motivated and develop communication skills. They are more apt to take advantage of the more adjustable learning pace (Li et al., 2018).

In exploring what hybrid and blended courses are, the most common definition is a course design that offers the best pedagogical practices from traditional classrooms and online courses (Hall & Villareal, 2015; Karoğlu et al., 2014; Kleinpeter, 2017; Lei & Lei, 2019; Linder, 2017; Margolis et al., 2017; Marquis & Ghosh, 2017; McGee & Reis, 2012; Pal et al., 2020; Pilcher, 2017; Saichaie, 2020; Shand & Glassett Farrelly, 2017; Shea et al., 2015; Shea et al., 2016; Sowan & Jenkins, 2013; van Oldenbeek et al., 2019; Young, 2014). This design allows students a more student-focused approach to learning (Arslan, 2020; Brown et al., 2022; Linder, 2017; Olmeda-Torre et al., 2021; Saichaie, 2020; Shand & Glassett Farrelly, 2017). It allows for a more personalized experience. Students can decide when, where, and what they learn. It also provides a more collaborative and interactive educational experience for the student.

Course Designs for Different Variations

Because there is no universally accepted definition of hybrid and blended learning, there is no prescribed way to design a course considering the variations of synchronous and asynchronous learning elements within a course. Regrettably, the research on course designs for the different variations is lacking. In fact, according to Ealy (2013), there are no guidelines for designing courses for different variations.

What little research is available on the course design variations can be summed up by Saichaie (2020). The author points out that the institution typically sets the differences in seat

time and asynchronous activities (Lei & Lei, 2019; Saichaie, 2020). It then depends on the instructor and the course of study (Epp et al., 2020; Klotz & Wright, 2017) to determine the different synchronous and asynchronous activities. Saichaie (2020) emphasizes that clarity and organization are fundamental for a hybrid or blended course to be successful in student learning. Marquis and Ghosh (2017) add that the instructor must also introduce and explain the course design for students to understand the expectations.

Hybrid and Blended Course Design Best Practices

With the variety of definitions and designs of hybrid and blended courses, it would be expected that there is a myriad of course design best practices as well. However, the best practices for designing hybrid and blended courses are concise. One study conducted by Firat (2016) found that students look for specific features in a course delivered through a learning management system. According to the students, those features indicate how good the class will be. The features are attractive designs, social media support, accessibility, effectiveness, interaction, and reinforcement (Firat, 2016). As students are the end-users of a course, it would be wise to consider their views when looking at best practices.

Community-Creating Interaction

Students are more engaged when there is a sense of community within the class (Baragash & Al-Samarraie, 2018; Gedik et al., 2013; Marquis & Ghosh, 2017; McGee & Reis, 2012). Because of the various available communication avenues, it is vital to prepare for better interactions (Gedik et al., 2013). Instructors must know how to connect with their students and ensure that students learn how to communicate with their instructors (Kleinpeter, 2018). Creating peer interaction and collaboration opportunities is also one of the most profitable facets of a hybrid course (Arslan, 2020; Epp et al., 2020; Marquis & Ghosh, 2017).

One study by Jaggars and Xu (2016) explored what course design features impacted student performance most. They found that the most impactful practice for students was student-teacher interaction. Instructors who showed an interest in students encouraged

students to put forth more effort (Jaggars & Xu, 2016; Robinson & Wizer, 2016; Shea et al., 2015). Instructors showed this commitment to the students by responding to students' questions quickly and encouraging students to engage with the instructor through various methods, such as email, discussion posts, and office hours. Students value instructor feedback (Margolis et al., 2017; Sowan & Jenkins, 2013; van Oldenbeek et al., 2019). Students feel valued by instructors when the instructor takes time to comment on a student's performance and progress.

Using the pre-existing communication technology within a learning management system can encourage that sense of community (Baldwin et al., 2018; Brown et al., 2022b; Epp et al., 2020). These communication tools can include discussion boards, messaging systems, and collaboration areas. Epp et al. (2020) discovered that if instructors developed a course with social interaction in mind, students tend to perform better in their courses (Hall & Villareal, 2015; Han et al., 2019; Karoğlu et al., 2014; Kleinpeter, 2017; Kleinpeter, 2018; McGee & Reis, 2012; Muchsini & Siswandari, 2020; Shea et al., 2015; Shea et al., 2016).

As students who grew up using technology, or digital natives, are becoming the majority of higher education classrooms, using tools with which they are already familiar can be a great benefit (Hu & Meyen, 2011; Kleinpeter, 2018; Lee, 2016; Marquis & Ghosh, 2017). For example, hybrid and blended courses that use social network sites such as YouTube and WhatsApp more positively engage students (Baragash & Al-Samarraie, 2018; Lee, 2016; Linder, 2017). However, any technology used for class should associate with a learning outcome (Gleason, 2013; Karoğlu et al., 2014; Linder, 2017; Shea et al., 2016)

Well-Organized Course Structure

A well-organized course structure can incorporate many practices. However, consistency within a course is critical (Klotz & Wright, 2017; Ralston-Berg & Braatz, 2021; Young, 2014). Ralston-Berg and Braatz (2021) recommend standardizing all courses within an institution. As students try to navigate through different courses, all designed differently, the students are required to learn a new system for each course. "Learners can learn more effectively if they are

not constantly frustrated by searching for the content" (Ralston-Berg & Braatz, 2021, p. 18). Standardizing the course design will eliminate the cognitive load needed to navigate the courses, allowing students to transfer that cognitive load toward learning the course content.

According to Gedik et al. (2013), designing an orientation to a hybrid or blended course is an important consideration (Brown et al., 2022b; Hu & Meyen, 2011; Kleinpeter, 2018; Ngampornchai et al., 2021). The results of a study by Margolis et al. (2017) showed that students requested this type of orientation. This orientation will allow students to understand how a hybrid or blended course differs from traditional and online courses (Brown et al., 2022a; Ngampornchai et al., 2021). It assists students in understanding the time commitments they will need to make. This orientation session need not only be applied to the course design. Students need explicit instructions to understand and effectively use the tools within a course fully (Ellis & Bliuc, 2019; Sowan & Jenkins, 2013; Young, 2014). Students need help to see how online and classroom activities are connected (Han et al., 2019; Linder, 2017). Students also need direct examples of navigating between online and in-class activities (Han et al., 2019; Young, 2014).

A standardized course system, as suggested by Ralston-Berg and Braatz (2021), may not always be possible. By looking at best design practices, an instructor or instructional designer can create a class where students are comfortable working. One of the structural pieces of a well-organized course is the ease of use and access through an easy navigation system within the course (Ealy, 2013; Jaggars & Xu, 2016; Shin & Cheon, 2019; Sowan & Jenkins, 2013). A course should have sufficient and easily understood menus from the beginning of the course (Baldwin & Ching, 2019; Hu & Meyen, 2011; Ngampornchai et al., 2021; Shin & Cheon, 2019). Pilcher (2017) recommends including a "Start Here" button for students to know where to go immediately (Ralston-Berg & Braatz, 2021; Robinson & Wizer, 2016; Shand & Glassett Farrelly, 2017). He also suggests that each module list the inclusive dates within the title of the module. Within the module, a module overview page with objectives, materials, links, assessments, and a lesson completion checklist should be included (Klotz & Wright, 2017;

Pilcher, 2017; Shannahan & Fredericks, 2022; Tyczynski & Mark, 2021). This overview helps students understand the expectations and helps them better gauge and plan their study time (Brown et al., 2022b; Shand & Glassett Farrelly, 2017). Course content should be presented to students in a logical manner that makes sense to students (Ralston-Berg & Braatz, 2021; Westover & Westover, 2014).

Courses organized into weekly modules help students track their progress (Klotz & Wright, 2017; Munguia et al., 2020). Shin and Cheon (2019) also found that courses with at least one module per week were better for students because the content was chunked into more manageable pieces. Courses that had fewer numbers of modules and fewer and larger assignments caused students to feel stress about their performance being linked to fewer scores (Shin & Cheon, 2019). All the content in a module should be related. Modules should be short enough not to overwhelm students (Klotz & Wright, 2017).

Course Resources

With a hybrid and blended course approach, instructors need clear instructions for assignments and activities (Jaggars & Xu, 2016; McGee & Reis, 2012; Pal et al., 2020; Sadaf et al., 2019). Students may not have access to instructor interpretation when attempting assignments. Clear instructions will promote the successful completion of the assessment. In addition to clear instructions, students want detailed grading rubrics to clarify grading criteria (Ralston-Berg & Braatz, 2021; Shin & Cheon, 2019; Young, 2014).

Westover and Westover (2014) found that for each face-to-face meeting if the instructor shared an overview of the concepts to be covered in that meeting time, students and the instructor made sure that adequate time was given to areas that were hurdles for the students without omitting other essential concepts. This time set aside allowed students to grapple with the content and return to class with questions, knowing they could receive help and feedback from the instructor.

One recommendation given by Gedik et al. (2013) in designing a hybrid or blended course is to provide resources in multiple formats (Margolis et al., 2017; Marquis & Ghosh, 2017; Robinson & Wizer, 2016; Sadaf et al., 2019). Videos should be captioned or have a transcript available, for example. In addition, students without disabilities will benefit from various formats (Linder, 2017; Sowan & Jenkins, 2013).

Like modules, chunking course content allows students to focus on understanding a few concepts without causing cognitive overload (Arslan, 2020; Shannahan & Fredericks, 2022). Not only does this improve comprehension, but it aids in student retention (Shin & Cheon, 2019). Even with learning videos, which could be considered more entertaining, the length of the video is ideally between six and ten minutes without pauses (Arslan, 2020; Klotz & Wright, 2017). Students are more likely to become distracted if the video lasts ten minutes or more.

Sowan and Jenkins (2103) followed Chickering and Gamson's (1987, as cited in Sowan & Jenkins, 2013) seven principles of effective teaching. These principles, high expectations, effective student-instructor contact, prompt feedback, collaboration among students, active learning, time on task, and respect for diverse ways of learning, were adhered to when developing a hybrid nursing research course. Throughout the class, the researchers gathered student satisfaction data. They found that it could be valuable to include an eighth principle within a hybrid or blended course: time management. The best practice they found to help students with self-regulation in courses is to divide large projects into smaller pieces and add due dates to the smaller portions (Motz et al., 2021; Nguyen & Rahman, 2018). Each assignment or activity should also be short enough to complete within one sitting (Klotz & Wright, 2017).

Nudge Theory

Instructors want their students to be successful. Indeed, that is why best practices exist. Sometimes students do not know how to be successful. Instructors guide students and hope that students see the way. Occasionally students need a hint, or a nudge, in the right direction.

Applying nudges and choice architecture within an educational setting is a relatively new field of study (Weijers et al., 2021). Current literature about nudges in education is not as prevalent as literature on nudges in other fields.

This section will discuss the nudge theory. The section starts with the history of the nudge theory, moves to how nudge theory has been used in education, and finishes with how nudge theory is currently used in course structure and design.

History of Nudge Theory

Nudge theory is a concept that began in the field of economics (Thaler & Sunstein, 2008) and applies to other fields, such as business, health, and education (Kosters & van der Heijden, 2015; Liu & Kremenkova, 2021; Sunstein, 2015). While the theory came to light recently, nudging has been used for centuries (Hongyang & Lucie, 2021).

Definition of Nudge Theory

Nudge theory became prevalent in 2008 when Richard Thaler and Cass Sunstein, two behavioral economists, wrote a book about it (Thaler & Sunstein, 2008). As defined by Thaler and Sunstein:

> A nudge, as we will use the term, is any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates. Putting fruit at eye level counts as a nudge. Banning junk food does not. (p. 6)

In another article, Sunstein (2015) further explains nudges as “interventions that preserve freedom of choice that nonetheless influence people’s decisions” (p. 2). In other words, a nudge is a small action that alters the probability of making a particular choice in a given situation. Nudges are designed to change behavior (Marchiori et al., 2017; Weijers et al., 2021).

Choice architecture is how Thaler and Sunstein (2008) explain designing information presentations to nudge decisions. The way choices are presented will impact the decision that is

made. Therefore, choice architects construct a positive decision environment to make it easy for people to do the right thing (Damgaard & Nielsen, 2018; Liu & Kremenkova, 2021; Neuhaus, 2020). In other words, a choice architect will frame information and design the presentation of the choices.

How Nudge Theory Came to Be

Looking back through history, one can see examples of nudging (Hongyang & Lucie, 2021). In the 17th century, many places throughout Europe were entrenched in famine. Potatoes were introduced as a drought-tolerant food, but people were hesitant to plant these because they were different. A king in Prussia planted potatoes in his royal garden to show people how easy this new crop was to care for and how much he enjoyed this new food. People saw this and quickly followed suit (Hongyang & Lucie, 2021). While the understanding behind what happened in this situation was unknown then, the king of Prussia did nudge his people to change.

Years later, people studied how to get others to do things. While Thaler and Sunstein popularized the nudge theory, and in Thaler's case, even won a Nobel Prize in 2017 for his work with the nudge theory (Earl, 2018), this theory was built upon the ideas of others. Thaler and Sunstein used the ideas of Amos Tversky and Daniel Kahneman, and Herbert Simon to formulate their theory about helping others make decisions wisely (Hortal, 2020).

In his article, Hortal (2020) explains the history of the nudge theory. The foundation of the nudge theory started in 1957 with Simon and his studies of bounded rationality. Bounded rationality describes the process of how people make decisions. Simon considered that our rationality has cognitive restraints and a complex environment (Hortal, 2020).

Tversky and Kahneman's continued to study this idea in 1979 (Hortal, 2020). They postulated that people have biases that contribute to irrational decisions. From this idea came the Prospect theory (Neuhaus, 2020). This theory was used to identify patterns in decisions human beings make. Tversky and Kahneman suggested that perhaps interventions can be

implied in a way that would not limit the decision-maker (Hortal, 2020). Thaler and Sunstein identified those interventions in 2008: nudges.

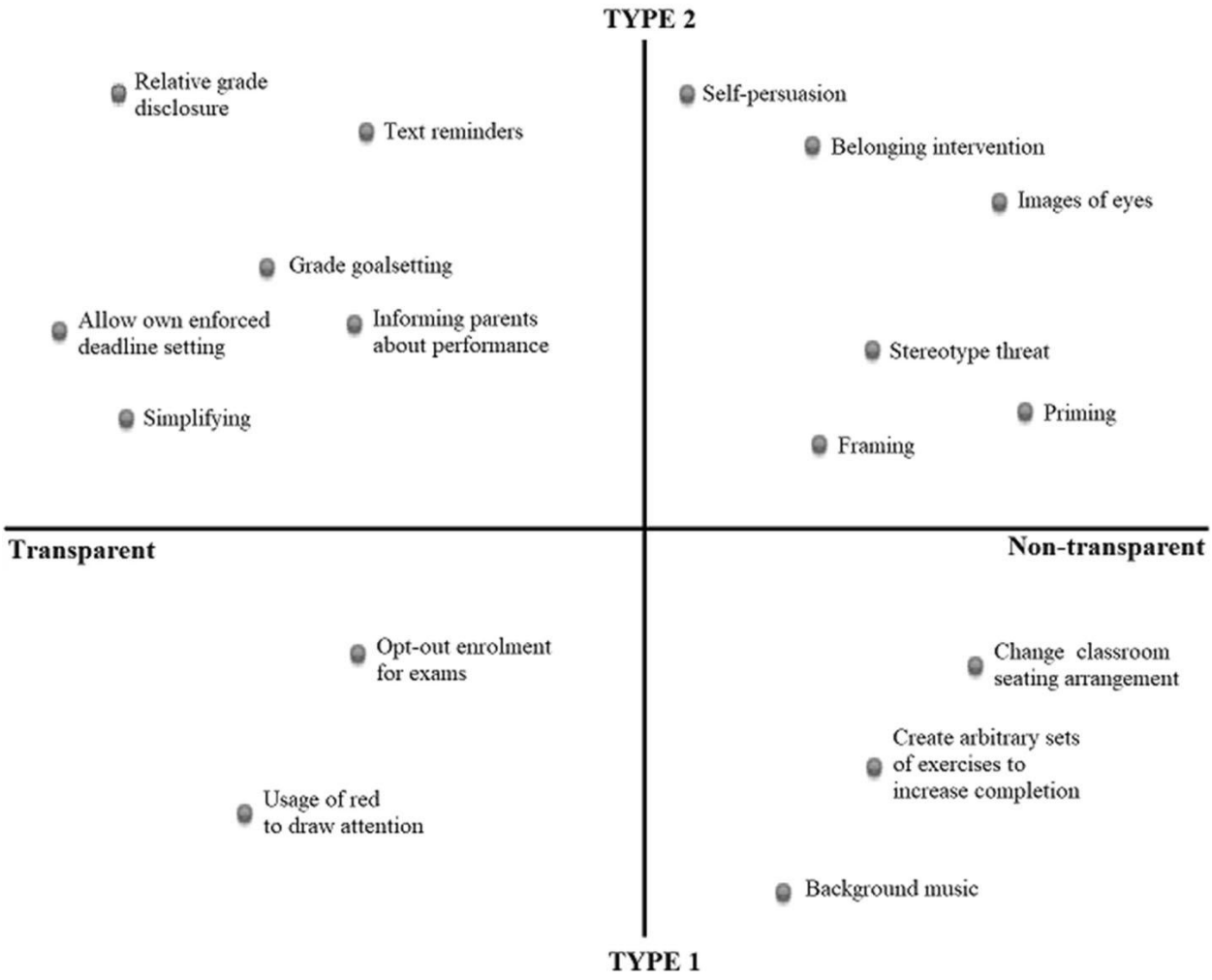
There are two types of nudges. Thaler and Sunstein (2008) call them System 1 and System 2 types of nudges. System 1 nudges are directed at automatic behavior (Marchiori et al., 2017; Weijers et al., 2021). People are unaware of the cue that triggers a behavior, the influence the cue has on the behavior, or the behavior outcome (Marchiori et al., 2017). An example of this type of nudge is to have a vocabulary word in red within a reading. This different colored word will cause the student naturally to slow down when reading. A System 2 nudge will trigger a response from the student to pause and reflect, thereby helping to create habits (Liu & Kremenkova, 2021; Marchiori et al., 2017; Weijers et al., 2021). It is also considered an informational nudge. (Weijers et al., 2021). An example of this type of nudge is to hang a poster on the door when entering a classroom that reminds students to silence their phones. Weijers et al. (2021) have renamed these from System 1 and System 2 to Type 1 and Type 2 nudges for education.

Hansen and Jespersen (2013) went on to further differentiate nudges. They separate nudges into transparent or non-transparent nudges (Hansen & Jespersen, 2013; Marchiori et al., 2017). A transparent nudge is “provided in such a way that the intention behind it, as well as the means by which behavioral change is pursued, could reasonably be expected to be transparent to the agent being nudged as a result of the intervention” (Hansen & Jespersen, 2013, p. 17). An example of a transparent nudge is an opt-out exam rather than an opt-in exam (Weijers et al., 2021). A non-transparent nudge is intended to encourage behavioral change without the students recognizing that they are being nudged (Marchiori et al., 2017; Weijers et al., 2021). An example of this type of nudge would be to change the classroom seating arrangement.

With these four types of nudges, as shown in Figure 1, a nudge matrix was developed by Weijers et al. (2021), with examples within each of the four nudge categories.

Figure 1

Nudge matrix with examples of each of the four nudge categories within an educational context.



Note: Figure taken from "Nudging in Education: From Theory Towards Guidelines for Successful Implementation," by R. J. Weijers, B. B. de Koning, & F. Paas, 2021, *European Journal of Psychology of Education*, *36*, 893 (https://doi.org/10.1007/s10212-020-00495-0). Creative Commons CC BY.

Each nudge can fit within a quadrant. A Type 1 nudge, more focused on an automatic response, can be transparent or non-transparent. The same is true for a Type 2 nudge.

Concerns About Nudges

As this is a relatively new area of study, some raise questions and concerns about using nudges (Engelen et al., 2018; Kosters & van der Heijden, 2015; Marchiori et al., 2017; Selinger & Whyte, 2011). Kosters and van der Heijden (2015) express the concern that the nudge theory does not have sufficient evidence to support its effectiveness (Hortal, 2020; Marchiori et al., 2017; Selinger & Whyte, 2011; Weijers et al., 2021). They continue that there is no framework to evaluate the effectiveness of nudging. Kosters and van der Heijen (2015) recommend that more studies be conducted (Damgaard & Nielsen, 2018; Marchiori et al., 2017; Weijers et al., 2021).

Weijers et al. (2021) express another challenge; nudging interventions do not seem to have long-lasting effects. Most studies discuss interventions that support immediate or short-term changes (Damgaard & Nielsen, 2018; Marchiori et al., 2017; Neergaard et al., 2021; Rodriguez et al., 2022). Nudges in education (Damgaard & Nielsen, 2018) focus on improving an end goal, such as a grade, not changing behavior (Rodriguez et al., 2022; Weijers et al., 2021), such as remembering to turn in an assignment.

Many people have expressed concern if it is ethically appropriate to nudge students (Engelen et al., 2018; Hansen & Jespersen, 2013; Selinger & Whyte, 2011; Sunstein, 2015; Weijers et al., 2021). Gallagher et al. (2018) distinguished ethical nudges as respectful to student autonomy, beneficial to learning, and fair. Unethical nudges are disrespectful to student autonomy, harmful, coercive, and unfair. They have further determined that nudges are inevitable. They conclude that if nudging is done without causing humiliation, showing students that the instructor cares about the students learning and success, instructors should already be doing those things that may be considered nudging (Engelen et al., 2018; Hortal, 2020). These are just good teaching practices (Liu & Kremenkova, 2021).

One final common critique of the nudge theory is that it infringes upon the foundations of individual freedom (Kosters & van der Heijden, 2015; Selinger & Whyte, 2011). The response is that no choice is taken away from an individual (Brown et al., 2022; Liu & Kremenkova, 2021; Marchiori et al., 2017; Sunstein, 2016; Thaler & Sunstein, 2008). An individual still has every

option available; the choices are just arranged or presented in such a way that the better choice is an easier one to make. For example, if a school district wants students to participate in a testing situation, giving the students the option to opt-out of the program will give the district more students taking the test. Students still have the choice to be a part of the testing or not.

Oreopoulous (2021) explains this further. A nudge retains all options. A shove restricts choices. As humans, we often rely on routine or habit. A nudge would set the default, or the automatic selection, to the desired outcome if the individual does not make a selection. A shove would remove the opt-out option in a testing situation. A choice is removed. Oreopoulous (2021) does point out that with younger students, choice-limiting scaffolding (shoving) may provide better progress, e.g., limiting screen time.

Current Uses of the Nudge Theory

Thaler's research as an economist (Earl, 2018) is the basis of the nudge theory (Dubner, 2021). This work has influenced many British and American politicians (Hansen & Jespersen, 2013; Hongyang & Lucie, 2021; Liu & Kremenkova, 2021; Sunstein, 2015). As a result, governmental nudge units have been established worldwide (Damgaard & Nielsen, 2018; Hansen & Jespersen, 2013; Hongyang & Lucie, 2021; Kosters & van der Heijden, 2015).

Szaszi et al. (2018) reviewed 156 empirical studies to discover 422 unique nudge interventions. Of the empirical studies, 42 percent have been conducted in the health sector. Nineteen percent of nudge studies were conducted in the sustainability sector. The other sectors are as follows: ten percent studied nudges in consumer choice, nine percent in finance, eight percent in prosocial behavior, six percent in transportation, and four percent of nudge studies were conducted in the education sector (Szaszi et al., 2018).

Nudge Theory in Education

Nudge theory in education is a newer field of study (Liu & Kremenkova, 2021; Neuhaus, 2020; Weijers et al., 2021). There have not been many empirical studies on nudging in education (Szaszi et al., 2018), although there have been many discussions of how education

can apply the nudge theory. Damgaard and Nielsen (2018) reviewed many of these papers and found three recurring insights:(a) students appreciate nudges; (b) nudges generate short-term effects on students; and (c) all nudges do not work for all students. Nevertheless, nudging is one of the multiple strategies to improve student motivation and performance (Azam et al., 2021; Brown et al., 2022a; Damgaard & Nielsen, 2018; Neuhaus, 2020). Selinger and Whyte (2011) have stated that nudges are intentional, timely, and strategic approaches intended to motivate students to interact with learning materials (Lawrence et al., 2019; Lawrence et al., 2021). Han et al. (2019) also encourage that through nudging interventions, an instructor can help students "make appropriate and timely adjustments to improve their experience" (p. 978) within a class.

Studies Using Nudging in Education

A study by Rodriguez et al. (2022) used a nudging intervention with an artificial intelligence system to identify at-risk students. Reminders and informational nudges significantly reduced student dropout rates. Fewer students dropped out because they felt that instructors supported them and their learning through their nudging messages (Brown et al., 2022a; Lawrence et al., 2019). While the system automated the messages, students felt that their instructors were interested in their successes. Students liked the messages they received.

Nudges can increase assessment performance and attendance (Azam et al., 2021; Damgaard & Nielsen, 2018; O'Connell & Lang, 2018; Rodriguez et al., 2022; van Oldenbeek et al., 2019). In a study by Azam et al. (2021), the effect nudging had on struggling students was evaluated. Struggling students received multiple informative messages with feedback throughout the unit. At the end of the unit, the average of the summative assessment scores of the participants increased by nearly ten points compared to the previous unit ($p<0.001$). In addition, although Azam et al. were not actively investigating student attendance, they noticed within their data that student attendance also increased ($p=0.001$).

In another study by van Oldenbeek et al. (2019), the researchers sent nudges in the form of emails to students to encourage them to complete the class preparation work. The

researchers found that those students who received the nudges were 1.5 times more likely to complete the preparation work than those who did not receive the email nudges. Those students who received the nudges also spent an average of 15 percent more time on preparation work in a given week than those who did not receive the nudge. Van Oldenbeek et al. (2019) also learned that email nudges were less influential as the semester progressed (Brown et al., 2022).

O'Connell and Lang (2018) worked with a hybrid undergraduate class. They explored the advantages of email reminders in improving study consistency and learning outcomes. The results indicate that occasional study reminders to students increased exam scores by more than 0.2 standard deviations from the exam average. O'Connell and Lang felt that this increase by using the intervention counteracts the reduction in class time in a hybrid setting.

Lawrence et al. (2021) conducted research that gave students nudges based on learning analytics data from the learning management system. Students who were not participating in the class through the learning management system were sent messages encouraging them to participate. Students feeling cared for by their instructors was evident in the results of this study. Another interesting point that this research team learned was that nudging must be an explicitly planned strategy (Brown et al., 2022a; Engelen et al., 2018; Neergaard et al., 2021). The instructor must know what to nudge (which assignments or activities) when to nudge, whom to nudge, and how to nudge (the exact wording of the nudge) (Lawrence et al., 2021). If this intentional plan is not well-crafted, the nudging strategies may not be as effective (Graham et al., 2017).

Researchers Brown et al. (2022a) wanted to determine the best approaches to nudging in education. They concluded, much like Lawrence et al. (2021), that a detailed plan for the nudge was necessary. Brown et al. (2022a) state that instructors should predetermine four to six concepts throughout the semester on which they want to nudge students. Too many nudges will result in nudge overload and students ignoring the nudges (Brown et al., 2022a; Shannahan &

Fredericks, 2022). Brown et al. (2022a) use the data from the learning management system to determine which students are not accessing the content. They also suggest that nudging earlier in the semester is better than later when the students are already overwhelmed. Finally, nudges are more effective for the students when the students are reminded of the benefits of using the content, the nudge has an approach of a concerned friend, and the nudge has a persuasive tone.

Many studies discuss the outcomes of nudges. Blumenstein et al. (2019) were curious about students' preferences and responses to early nudges. The research team received 588 responses to a survey. The results indicate that the majority of students surveyed wanted to receive nudges. Eighty percent of students wanted to be contacted for unsatisfactory class performance. Not only that, but 67 percent of those surveyed wanted notification right away. Regarding how the nudges made the students feel, 55 percent of the students responded that nudges made them feel better, and 54 percent of the students indicated that they felt as if they could do better. Nearly 75 percent of those students commented on the care and interest of the instructors in the students' welfare.

Types of Nudges Used in Education

Through a literature review of educational nudge interventions, Damgaard and Nielsen (2018) identified and grouped intervention nudges into sixteen nudge categories. These categories are defaults; framing; peer group manipulation; varying deadline and exam frequency; goal setting; reminders targeting students; reminders targeting parents and teachers; easing access to information; providing information about behavior and skills; providing information on returns to schooling (why is this imperative); providing financial aid information; offering basic assistance; skills to alleviate self-control; social comparison; using non-monetary rewards; and social belonging, identity activation, and mindset nudges. Many of these interventions are aimed directly at students and their studies. Some interventions are directed

toward parents to engage them in their student's success. This section will focus on interventions to help students with their learning objectives.

Neuhaus (2020) illustrates two strategies when using nudges in education. The first is the herd mentality. People naturally want to belong to the group. People who are unsure of a situation tend to look at society for validation or social proof. The herd mentality is non-invasive, voluntary, and passive. An example of using social proof is to make a student aware of a low score on an assessment and also provide a comparison of the average score. Another strategy discussed by Neuhaus (2020) is loss aversion. Neuhaus explains that human beings are unwilling to lose. A loss is considered twice as damaging as gaining the same amount. Neuhaus gives the example that losing $1 has a negative impact equal to winning $2. Therefore, loss aversion motivates to a greater extent than potentially winning. In education, this can work to encourage students to perform better. For example, instead of starting at zero and earning points for correct answers, students could begin with a score of 100 percent and lose points for incorrect answers. Students do not want to lose points and are motivated to perform better.

As education moves to learning environments that encourage flexibility in content delivery, students become more responsible for their learning and efforts (Fritz, 2017; O'Connell & Lang, 2018). For some students, this is a new concept (Linder, 2017; Sowan & Jenkins, 2013; Tomas et al., 2019). Nudging in a classroom should be constructed to make it easy for students to do the right thing (Damgaard & Nielsen, 2018; Neuhaus, 2020; Thaler & Sunstein, 2008). Sunstein (2016) identified thirteen strategies he describes as a nudge. Five of these strategies lend themselves well to education: making information available, simplifying complex tasks, providing specific information that reminds, increasing ease of use, and framing and scheduling choices. He also advises that the presentation of every choice we make has been crafted by another (Sunstein, 2016). Students are bombarded with choices every day. Instructors can explicitly design and structure them to assist students in making better choices (Engelen et al., 2018).

A common nudging intervention used in classrooms is sending students reminders (Blumenstein et al., 2019; Damgaard & Nielsen, 2018; O'Connell & Lang, 2018; Rodriguez et al., 2022; Szaszi et al., 2018). For example, O'Connell and Lang (2018) emailed students on days they did not have the class to remind them to study materials even though there was no class. The emails were intended to help improve the overall consistency of studying. O'Connell and Lang saw an increase of an average of 3.8 percentage points on the exam for students who received the nudges. Rodriguez et al. (2022) also sent nudges as messages to students. However, they sent out multiple kinds of nudges, such as advice for goal setting, reminders, social inclusion, learning resources, options to pass the class, and teacher assistance. The investigators looked at the usefulness and effectiveness of nudging students. The findings indicated that nudges do positively influence students' performance. Reminders and informational nudges bettered the completion rates of assignments by students. The researchers also concluded that students' performance increased using different nudges. The learners felt more support and guidance because of the instructors' recommendations.

Blumenstein et al. (2019) studied nudges to provide feedback to students on progress through three different case studies. In one case study, the instructor provided students with resources and guidance. They helped students complete assignments by breaking larger projects into smaller chunks with individual due dates. They also sent out nudges inviting students to seek assistance from the instructors. In another case study, the instructor nudged students by reminding them what the goal was and what the students were sacrificing.

Blumenstein et al. (2019) also remind that nudges are not just for at-risk students. Students who are being successful can use nudges to encourage them to engage with additional resources that may expand their schemas. Oreopoulos (2021) concurs that nudges are not just for at-risk students. He states that if doing something that takes little effort can "consistently generate even small long-term impacts, we shouldn't hold back from providing them to every student in the country" (p. 12).

It is essential to affirm that students' efforts are worthwhile (Brown et al., 2022a). Brown et al. (2022a) discussed nudges being a critical factor in assisting students in planning the time for their course resources and activities (Blumenstein et al., 2019; Rodriguez et al., 2022). The researchers envision nudges as supportive and encouraging to students (Neergaard et al., 2021). These nudges include short video recordings, learning management system announcements, and individual emails or phone calls.

Nudge Theory in Course Structure and Design

Much of the research on nudging in education discusses using reminders for students. There are other ways to nudge students, although not many have been explored (Epp et al., 2020). Sunstein (2016) argues that a person crafted every choice another person makes to be presented in a specific way. Why can't we use that concept and design structure to improve students' choices? Being a better choice architect could be a way to improve student learning outcomes. In addition, a better choice architect may align with and enrich the best practices in course design. In this section, course structure and design using nudges will be discussed.

Navigation

In any educational setting that uses a learning management system, students must be able to locate materials and assessments. Instructors should consider how they make these materials available to students to prompt them to take full advantage of those resources (Baldwin et al., 2018; Graham et al., 2017; Nguyen & Rahman, 2018; Shand & Glassett Farrelly, 2017). Graham et al. (2017) conclude that "choice architecture plays an important part in this process, since the ease with which students can access relevant information can have a positive effect on their engagement" (p. 41). Technology in education should make learning more accessible, not become a barrier to learning (Alvarado-Alcantar et al., 2018; Lee, 2016; Ralston-Berg & Braatz, 2021; Simunich et al., 2015).

Texas Tech K-12 and Liberty Education worked together to create a hybrid course for students in Brazil (Pal et al., 2020). As part of this development, the instructional designers

needed a way to communicate clearly with students of another language and culture, which activities were online and which were face-to-face. With a simple nudge of green and blue icons for face-to-face and online, students could know what activities to do when quickly.

An early Hu and Meyen (2011) study on nudges in education surveyed instructors and students about their preferences for online courses. The results should be taken into consideration when designing hybrid and blended courses. Two hundred students and 35 instructors participated in the survey. Both groups' second highest design preference was "Allow students to easily access required instructional resources" (p. 7). The other preference ranked high on the list for both groups was "Allow students to easily navigate from the start to the end of an assigned task" (p. 7). When creating a course in a learning management system, an instructor must organize content to achieve ease of access (Baldwin & Ching, 2020; Hu & Meyen, 2011; Kleinpeter, 2018; Lee, 2016; Nguyen & Rahman, 2018). Creating this ease of access is nudging students toward the desired content.

Researchers Ngampornchai et al. (2021) have found that students are more comfortable in a class where they can focus on the content rather than course navigation. They looked at the level of findability in a course. Findability is "the degree to which a particular object is easy to discover or locate, [as well as] the degree to which a system or environment supports navigation and retrieval" (Morville, 2005, as cited in Simunich et al., 2015, p.174). A course design that is not intuitive increases student frustration and decreases student motivation. Simunich et al. (2015) found that in a learning management system course in which things were challenging to find, students became frustrated and gave up trying to find the resources. Ngampornchai et al. (2021) found that the preferred course style within a learning management system was a simple homepage with only the necessary navigation links. Students with too many choices that are seen as unnecessary will become confused and distracted (Sorgenfrei & Smolnik, 2016). Ngampornchai et al. (2021) discuss the elements that make a good course from a student's point of view. Students want a well-organized course that is easy to navigate and uses relevant

multimedia. Students also want to reach the content within two clicks (Nguyen & Rahman, 2018).

Ngampornchai et al. (2021) recommended several items to help instructors build these well-organized, easy-to-navigate courses. First, the homepage of a course is the most important real estate of a course (P. Hendricks, personal communication, June 2022). A homepage should be brief and visually appealing while containing the most frequently visited links (Jaggars & Xu, 2016; Ngampornchai et al., 2021). Second, a course's navigation menu should be organized alphabetically or by the most frequently visited pages. In many learning management systems, instructors can hide navigation links from students' views. However, instructors should avoid hiding links that may be useful. Third, it is recommended to order modules chronologically, or linearly. That may be by weeks, chapters, units, et cetera, but instructors should have the modules in the order students will complete them. Within each module, an instructor should include all materials students will need to complete that module. Materials include instruction pages, discussion boards, readings, external links, assignments, and quizzes or tests.

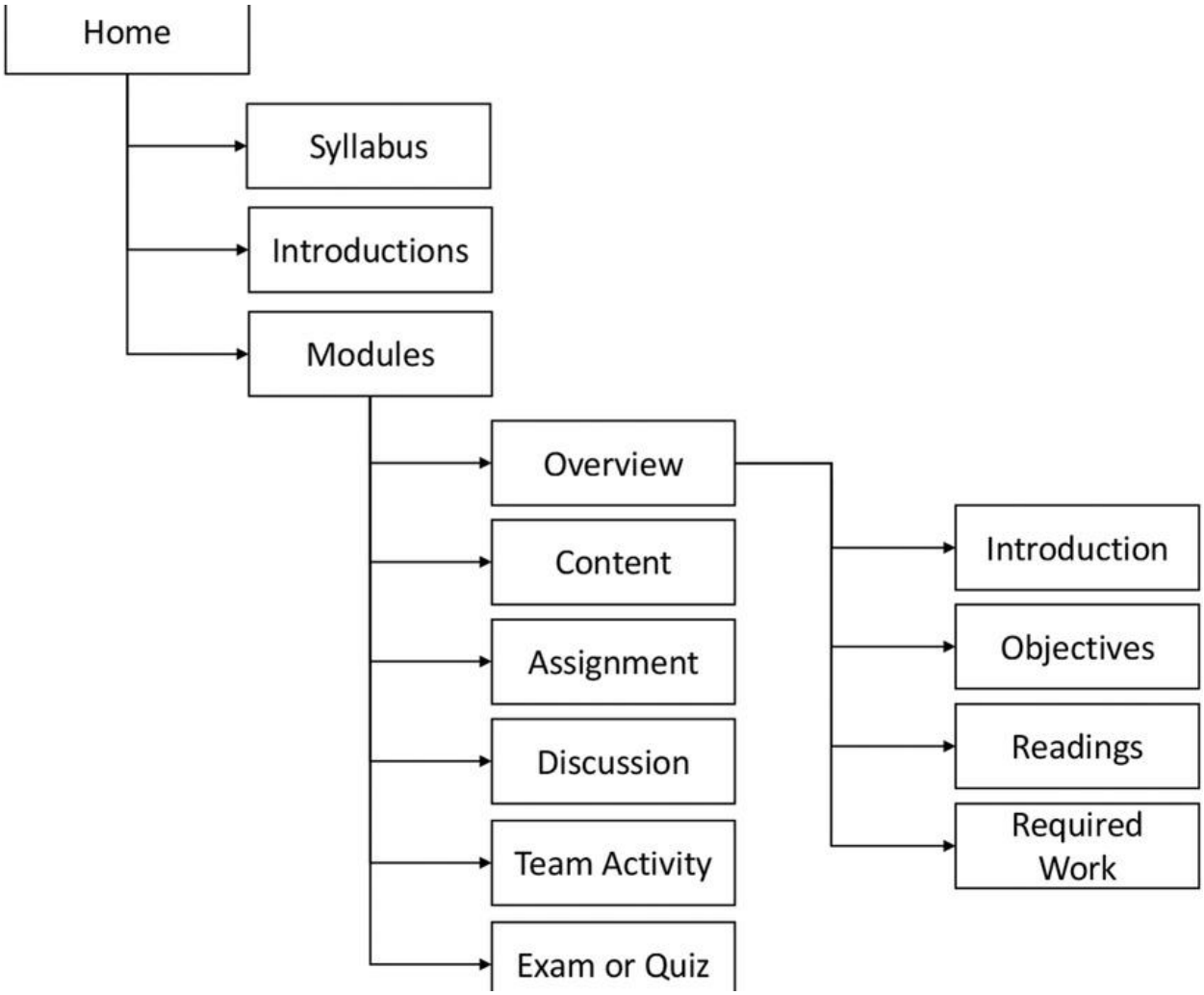
Lee (2016) has similar suggestions. The author discusses making a learning management system course simple and intuitive by designing those courses to be clear and concise in order to remove barriers for all learners (Baldwin et al., 2018; Ngampornchai et al., 2021; Jaggars & Xu, 2016; Ralston-Berg & Braatz, 2021; Robinson & Wizer, 2016; Simunich et al., 2015). For the navigation of a course, Lee (2016) recommends simplicity, leading the students to the desired areas with little difficulty. By designing a simplified course, students are directed, or nudged, to content through links rather than searching to find content themselves. As Baldwin et al. (2018) stated, simplifying the menu options will nudge students through the course the way the instructor intends.

Ralston-Berg and Braatz (2021) argue for templatizing all learning management system courses within an institution. While this is not always possible, having an intuitive navigation

system within each course is desired. The researchers share a flowchart of a clear and concise course navigation system.

Figure 2

Course structure and naming conventions.



Note: Figure taken from "Online Course Design Structure and Interface," by P. Ralston-Berg & H. Braatz, 2021, *New Directions for Adult and Continuing Education*, *2021*, 21. (https://doi.org/10.1002/ace.20411).

With this structure, the homepage should only have links to the necessary sections of the course, such as the syllabus, course introduction, and modules section. Each module should have all content, assignments, activities, and assessments needed for that section

nested within the module. Instructors should organize the materials chronologically to aid the student as they work through the module (Ralston-Berg & Braatz, 2021).

Chunking

Baldwin and Ching (2019) have created an online course design checklist. While specified for online, the instrument is also valid for hybrid and blended courses. The authors created this checklist to give instructors nudges as they design their courses. The first reminder on the checklist for instructors is to chunk information into more manageable lessons (Baldwin & Ching, 2020; Baldwin et al., 2018; Shand & Glassett Farrelly, 2017). When presented with a great deal of information, students are less able to process the material without overwhelming the students' cognitive load (Arslan, 2020; Shin & Cheon, 2019). By presenting the material in smaller doses, the students will be able to manage the material and better learn it (Baldwin & Ching, 2019).

When chunking units, Shannahan and Fredericks (2022) were cognizant of the lengths of the lessons they requested students to complete. If the instructors required an extended reading during one unit, they would nudge students by offering a shorter assessment to complete. The instructors found that "balancing workloads gives students space to breath, catch up, and refresh" (p.143).

In his study, Arsland (2020) noted that it is practical to chunk content, or present content in smaller segments, within a flipped classroom, which is a blended course variation. For example, students who sit through an hour-long video lecture will lose interest after about 15 minutes. Chunking the same video into six smaller videos will help students focus on the material without overloading their cognitive comprehension and reducing their retention processes.

As many instructors were forced to move courses online in the spring of 2020 quickly, they had the incentive to look at their classes in different ways. Instructors seriously considered hybrid and blended courses, whereas those options were foreign and not given due

consideration before the pandemic. Shannahan and Fredericks (2022) redeveloped a class using a flipped classroom. Lectures were presented through videos. The students commented that they lost interest and focus during long lectures online. The instructors chunked the video into smaller videos focused on specific topics. They also interspersed the videos with readings and tasks. The instructors found that the shorter videos and the interspersing of those videos encouraged students to complete the assigned preparation. Chunking the videos increased student flexibility and preparation. Students could log into the online portal and complete a task or two at a time rather than setting aside several hours to complete the assigned material.

Just as instructors are adjusting their classes to have more online content, students are adjusting how they are consuming that content. While reviewing guidelines for designing online courses for mobile devices, Baldwin and Ching (2020) point out that two-thirds of online students use a mobile device to complete coursework. Content looks different on a mobile device than on a desktop computer. While the recommendations the researchers give in designing and structuring an online course focus on creating a more mobile-friendly design, the interventions are valuable for all students. Baldwin and Ching refer to the Canvas Course Evaluation Checklist (CCEC; Canvas, 2018, as cited in Baldwin & Ching, 2020), which states that chunking content is an “essential and standard design component to online learning” (Canvas, 2020). Baldwin and Ching recommend that content be chunked into smaller parts of no more than 2,000 words. For a mobile device, chunking improves accessibility. By chunking content into more manageable pieces such as this, students, in general, will be able to understand the content better.

Recommendations for Further Research

I recommend the following topics for further research from my studies into hybrid and blended learning and nudge theory in education.

There is very little research on course designs for different hybrid and blended course variations. It would be interesting to explore the effects of best practices on different hybrid and blended course variations.

Other native tools available in learning management systems may be used to nudge students. The research has focused on messaging, course structure, and some chunking. How would content page due dates and module prerequisites affect student completion rates in a hybrid or blended course?

Conclusion

The purpose of this literature review was to survey the current literature on best practices for hybrid and blended course design in higher education and how nudge theory is used in this context. Hybrid and blended course designs are important because they provide students with various learning experiences. Nudge techniques are amenable to inclusion in hybrid and blended courses because they are easy to teach and apply, can be modified to fit various learning goals, and allow flexibility in delivering learning outcomes.

Research question 1 was to determine best practices in hybrid and blended courses. Hybrid and blended courses require careful alignment of delivery methods with accepted pedagogical methodologies to maximize student learning; considerations regarding course length and structural design must be made within the context of particular courses.

Research question 1a was to define hybrid and blended courses. People cannot agree on standardized definitions of hybrid and blended learning. The difference between a hybrid or blended course and a traditional face-to-face course is that students and instructors meet less frequently, allowing the students the flexibility to learn at their own pace using online exercises (Pilcher, 2017). However, the distinction between hybrid and blended courses is nebulous. In many cases, hybrid and blended are used interchangeably to mean that part of the class is in person while other portions are online. The most distinctive explanation between hybrid and

blended learning is given by Saichaie (2020). Hybrid learning intentionally replaces seat time with technology. Blended learning does not replace seat time.

Research Question 1b was to determine differences in course designs for course variations. There are no course variations design guidelines (Ealy, 2013). The institution often sets seat times. Instructors must carefully consider the organization of a course in either modality to provide an avenue for success for students (Saichaie, 2020). Marquis and Ghosh (2017) add that instructors must also introduce and explain the course design for students to understand the expectations.

The second research question examined how nudge theory is used in hybrid and blended courses. Nudges are used in hybrid and blended courses to increase engagement and student success. They are structured to align a student's experience with his or her learning outcomes. Nudges help students reach their goals, instead of an approach dependent on completing work assignments.

Research question 2a was to delve into the history of the nudge theory. Nudge theory in education is a relatively new area of study (Weijers et al., 2021). Nudging is one strategy that instructors can use to help improve student motivation and performance (Azam et al., 2021). Much of the research done on nudging in education has focused on one particular category: messaging (Damgaard & Nielsen, 2018). Students appreciate the reminders to complete tasks in class (Damgaard & Nielsen, 2018).

Research question 2b explored how nudge theory is defined and used in an educational setting. The majority of nudges in education are reminders to students. There are other ways to nudge students besides reminders. Nudges are intentional and strategic interventions designed to motivate students (Selinger & Whyte, 2011). Students tend to appreciate nudges as they feel the care and concern of instructors.

Finally, research question 2c was to consider how course designs in hybrid and blended courses can nudge students. When designing a course in a learning management system,

instructors can make the content simple for students to locate. Students prefer to focus on the content rather than learning how to navigate the system (Ngampornchai et al., 2021). A simple homepage, linear modules, and streamlined content within the module can nudge students to navigate the course successfully. Another strategy is to chunk content. By making the content shorter and more manageable, students will better understand the content (Baldwin & Ching, 2019) and will not be discouraged.

In hybrid and blended courses, instructors can use many tools to engage students and improve learning. Instructors can carefully consider their courses to determine the best face-to-face and technology resources for their students. Instructors can also design their learning management systems to nudge students to complete the content successfully.

References

Allen, I. E., Seaman, J., & Garrett, R. (2007). *Blending in: The extent and promise of blended education in the United States*. Sloan Consortium. https://files.eric.ed.gov/fulltext/ED529930.pdf

Al Najdi, S. M. (2014). Hybrid learning in higher education. In M. Searson & M. Ochoa (Eds.), *Proceedings of SITE 2014–Society for Information Technology & Teacher Education International Conference* (pp. 214-220). Jacksonville, Florida, United States.

Alvarado-Alcantar, R., Keeley, R. G., & Sherrow, B. L. (2018). Accessibility and usability of preferences in blended learning for students with and without disabilities in high school. *Journal of Online Learning Research*, *4*(2), 173-198.

Anglia Ruskin University. (n.d.) *Distance learning: A history of flexibility* [infographic]. eLearning Industry. https://elearningindustry.com/the-history-of-distance-learning-infographic

Arslan, A. (2020). Instructional design considerations for flipped classroom. *International Journal of Progressive Education*, *16*(6). https://doi.org/10.29329/ijpe.2020.280.3

Azam, F., Shaheen, A., Irshad, K., & Ahmer, H. (2021). Nudging to improve: Impact of nudges on students' progress and academic performance. In S. D. Correia, S. Dubovicki, P. D. Nhan, A. H. P. K. Putra, S. Mia, & J. Simarmata (Eds.), *Proceedings of the International Conference on Medical Education (ICME 2021)*, *567*, 20-23. https://doi.org/10.2991/assehr.k.210930.004

Baldwin, S. J., & Ching, Y.-H. (2019). An online course design checklist: Development and users' perceptions. *Journal of Computing in Higher Education*. *31*, 156-172. https://doi.org/10.1007/s12528-018-9199-8

Baldwin S. J., & Ching, Y.-H. (2020). Guidelines for designing online courses for mobile devices. *TechTrends*, *64*, 413-422. https://doi.org/10.1007/s11528-019-00463-6

Baldwin, S. J., Ching, Y.-H., & Hsu, Y.-C. (2018). Online course design in higher education: A review of national and statewide evaluation instruments. *TechTrends*, *62*(3), 46-57. https://doi.org/10.1007/s/1528-017-0215-z

Baragash, R. S., & Al-Samarraie, H. (2018). An empirical study of the impact of multiple modes of delivery on student learning in a blended course. *The Reference Librarian*, *59*(3), 149-162. https://doi.org/10.1080/02763877.2018.1467295

Barbour, M. K., & Kennedy, K. (2014). K-12 online learning: A worldwide perspective. In A. Hirumi (Ed.), *Grounded designs for online and hybrid learning: Trends and technologies* (pp. 53-74). International Society for Technology in Education.

Blumenstein, M., Liu., D. Y. T., Richards, D., Leichtweis, S., & Stephens, J. M. (2019). Data-informed nudges for student engagement and success. In J. M. Lodge, J. C. Horvath, & L. Corrin (Eds.). *Learning analytics in the classroom: Translating learning analytics research for teachers*, 185-207. Routledge.

Brown, A., Lawrence, J., Basson, M., Axelsen, M., Redmond, P., Turner, J., Maloney, S., & Galligan, L. (2022a). The creation of a nudging protocol to support online student engagement in higher education. *Active Learning in Higher Education*, 1-15. https://doi.org/10.1177/14697874211039077

Brown, A., Lawrence, J., Basson, M., & Redmond, P. (2022b). A conceptual framework to enhance student online learning and engagement in higher education. *Higher Education Research & Development*, *41*(2), 284-299. https://doi.org/10.1080/07294360.2020.1860912

Canvas. (2020, February). *Course Evaluation Checklist: Mobile App Design Considerations*. Instructure Community. Retrieved from https://docs.google.com/document/d/1Xj6bPQryna4CZhcbBhNC92LEQoNVQ6OwCjepva346XQ/copy

Damgaard, M. T., & Nielsen, H. S. (2018). Nudging in education. *Economics of Education Review*, *64*, 313-342. https://doi.org/10.1016/j.econedurev.2018.03.008

Dubner, S. J. (Host). (2021, September 8). All you need is nudge (No. 474) [Audio podcast episode]. In *Freakonomics Radio*. Renbud Radio, LLC. https://freakonomics.com/podcast/all-you-need-is-nudge/

Ealy, J. B. (2013). Development and implementation of a first-semester hybrid organic chemistry course: Yielding advantages for educators and students. *Journal of Chemical Education*, *90*, 303-307. https://dx.doi.org/10.1021/ed200858p

Earl, P. E. (2018). Richard H. Thaler: A Nobel Prize for behavioral economics. *Review of Political Economy*, *30*(2), 107-125. https:/doi.org/10.1080/09538259.2018.1513236

Ellis, R. A., & Bliuc, A.-M. (2019). Exploring new elements of the student approaches to learning framework: The role of online learning technologies in student learning. *Active Learning in Higher Education*, *20*(1), 11-24. https://doi.org/10.1177/1469787417721384

Engelen, B., Thomas, A., Archer, A., & van de Ven, N. (2018). Exemplars and nudges: Combining two strategies for moral education. *Journal of Moral Education*, *47*(3), 346-365. https://doi.org/10.1080/03057240.2017.136966

Epp, C. D., Phirangee, K., Hewitt, J., & Perfetti, C. A. (2020). Learning management system and course influences on student actions and learning experiences. *Educational Technology Research and Development*, *68*, 3263-3297. https://doi.org/10.1007/s11423-020-09821-1

Firat, M. (2016). Determining the effects of LMS learning behaviors on academic achievement in a learning analytic perspective. *Journal of Information Technology Education: Research*, *15*, 75-87.

Fritz, J. (2017). Using analytics to nudge student responsibility for learning. *New Directions for Higher Education*, *2017*(179), 65-75. https://doi.org/10.1002/he.20244

Gallagher, A., Brennan, J., & Loughlin, C. (2018). The ethics of 'nudge' in professional education. *Nursing Ethics*, *25*(7), 821-822. https://doi.org/10.1177/0969733018802643

Garrison, D. R., & Archer, W. (2000). Distance education, design and technology. In *A transactional perspective on teaching and learning: A perspective for adult and higher education* (pp. 175-195). Emerald Group Publishing Limited.

Gedik, N., Kiraz, E., & Ozden, M. Y. (2013). Design of blended learning environment: Considerations and implementation issues. *Australasian Journal of Educational Technology*, *29*(1), 1-19.

Glazer, F. (2012). Introduction. In F. Glazer (Ed.), *Blended learning: Across the disciplines, across the academy* (pp. 1-11). Stylus Publishing.

Gleason, J. (2013). An interpretive argument for blended course design. *Foreign Language Annals*, *46*(4), 588-609. https://doi.org/10.1111/flan.12050

Graham, A., Toon, I., Wynn-Williams, K., & Beatson, N. (2017). Using 'nudges' to encourage students engagement: An exploratory study from the UK and New Zealand. *The International Journal of Management Education*, *15*, 36-46. https://dx.doi.org/10.1016/j.ijme.2017.04.003

Hall, S., & Villareal, D. (2015). The hybrid advantage: Graduate student perspectives of hybrid education courses. *International Journal of Teaching and Learning in Higher Education*, *27*(1), 69-80.

Han, F., Pardo, A., & Ellis, R. A. (2019). Students' self-report and observed learning orientations in blended university course design: How are they related to each other and to academic performance? *Journal of Computer Assisted Learning*, *36*, 969-980. https://doi.org/10.1111/jcal.12453

Hansen, P., & Jespersen, A. (2013). Nudge and manipulation of choice: A framework for the responsible use of the nudge approach to behavior change in public policy. *European Journal of Risk Regulation*, *4*(1), 3-28. https://doi.org/10.1017/S1867299X00002762

Hongyang, L., & Lucie, K. (2021). Discussion on the feasibility of nudge in education. *Journal of Educational Theory and Management*, *5*(1), 68-73. https://doi.org/10.26549/jetm.v5i1.6760

Hortal, A. (2020). Evidence-based policies, nudge theory, and Nancy Cartwright: A search for causal principles. *Behavioural Public Policy*, 1-20. https://doi.org/10.1017/bpp.2020.55

Hu, X. C., & Meyen, E. L. (2011). A comparison of student and instructor preferences for design and pedagogy features in postsecondary online courses. *International Journal of Online Pedagogy and Course Design*, *1*(3), 1-17. http://doi.org/10.4018/ijopcd.2011070101

Jaggars, S. S., & Xu, D. (2016). How do online course design features influence student performance? *Computers & Education*, *95*, 270-284. http://dx.doi.org/10.1016/j.compedu.2016.01.014

Karoğlu, A. K., Kİraz, E., & Özden, M. Y. (2014). Good practice principles in an undergraduate blended course design. *Egitim Ve Bilim*, *39*(173).

Kleinpeter, J. R. (2017). Students' perceptions and attitudes upon enrollment in an undergraduate hybrid design course. *The International Journal of Learning in Higher Education*, *24*(2), 53-63. https://doi.org/10.18848/2327-7955/CGP/v24i02/53-63

Kleinpeter, J. R. (2018). College students' perceptions upon enrollment in a hybrid design course: A replication study. *The International Journal of Technologies in Learning*, *24*(1-2), 1-15. http://doi.org/10.18848/2327-0144/CGP/v25i01/1-15

Klotz, D. E., & Wright, T. A. (2017). A best practice modular design of a hybrid course delivery structure for an executive education program. *Decision Sciences Journal of Innovation Education*, *15*(1), 25-41.

Kosters, M., & van der Heijden, J. (2015). From mechanism to virtue: Evaluating nudge theory. *Evaluation*, *21*(3), 276-291. https://doi.org/10.1177/1356389015591218

Lawrence, J., Brown, A., Redmond, P., & Basson, M. (2019). Engaging the disengaged: Exploring the use of course-specific learning analytics and nudging to enhance online

student engagement. *Student Success*, *10*(2), 47-58. https://doi.org/10.5204/ssj.v10i2.1295

Lawrence, J., Brown, A., Redmond, P., Maloney, S., Basson, M., Galligan, L., & Turner, J. (2021). Does course specific nudging enhance student engagement, experience and success? A data-driven longitudinal tale. *Student Success*, *12*(2), 28-37. https://doi.org/10.5204.ssj.1914

Lee, C.-A. K. O. (2016). Universal design best practices: Recommendations for blended and online learning in higher education with Instructure Canvas. In *Proceedings of EdMedia 2016–World Conference on Educational Media and Technology*, 1808-1813. Vancouver, BC, Canada. https://www.learntechlib.org/primary/p/173191/

Lei, S. A., & Lei, S. Y. (2019). Evaluation of benefits and drawbacks of hybrid courses: Perspectives of college instructors. *Education*, *140*(1), 1-8.

Li, J., Kay, R. & Markovich, L. (2018). Student attitudes toward blended learning in adult literacy and basic skills college programs. *Canadian Journal of Learning and Technology*, *44*(2), 1-36. https://doi.org/10.21432/cjlt27573

Linder, K. E. (2017). Fundamentals of hybrid teaching and learning. *New Directions for Teaching and Learning*, *149*, 11-18. https://doi.org/10.1002/tl.20222

Liu, H., & Kremenkova, L. (2021). Discussion on the feasibility of nudge in education. *Journal of Educational Theory and Management*, *5*(1), 68-73. https://doi.org/10.26549/jetm.v5i1.6760

Marchiori, D. R., Adriaanse, M. A., & De Ridder, D. T. (2017). Unresolved questions in nudging research: Putting the psychology back in nudging. *Social and Personality Psychology Compas*, *11*(1), e12297. https://doi.org/10.1111/spc3.12297

Margolis, A. R., Porter, A., L., & Pitterle, M. E. (2017). Best practices for use of blended learning. *American Journal of Pharmaceutical Education*, *81*(3), Article 49.

Marquis, G. P., & Ghosh, S. (2017). Student preferences for a hybrid course. *Journal of Education for Business*, *92*(3), 105-113. https://dx.doi.org/10.1080/08832323.2017.1289886

Matthews, D. (1999). The origins of distance education and its use in the United States. *T.H.E. Journal*, *27*(2), 54-66. https://www.learntechlib.org/p/89339/

McGee, P. (2014). Blended course design: Where's the pedagogy? *International Journal of Mobile and Blended Learning*, *6*(1), 33-55. https://doi.org/10.4018/ijmbl.2014010103

McGee, P., & Reis, A. (2012). Blended course design: A synthesis of best practices. *Journal or Asynchronous Learning Networks*, *16*(4), 7-22.

Muchsini, B., & Siswandari, S. (2020). Hybrid learning design to minimize academic stress of digital natives' generation in accounting course. *Journal of Educational Science and Technology (EST)*, *6*(1), 1-8. https://doi.org/10.26858/est.v6i1.11045

Munguia, P., Cheong, C., Cheong F., & Gharaie, E. (2020). Exploratory variations in course structure consistency within the learning management system. In T. McLaughlin, A. Chester, B. Kennedy, & S. Young (Eds.). *Tertiary Education in a Time of Change*, 99-111. https://doi.org/10.1007/978-981-15-5883-2_8

Neergaard, H., Robinson, S., & Jones, S. (2021). Transformative learning in the entrepreneurship education process: The role of pedagogical nudging and reflection. *International Journal of Entrepreneurial Behavior & Research*, *27*(1), 251-277. https://doi.org/10.1108/IJEBR-04-2020-0235

Neuhaus, T. (2020). Nuding education: The (potential) role in decision architectures in improving educational settings. *International Journal of Education and Research*, *8*(9), 73-86.

Ngampornchai, A., Trail-Constant, T., & Swenson, N. (2021). How students navigate in online classrooms: The link between usability and instructional design best practices. *International Journal on E-learning*, *20*(4), 433-457. https://www.learntechlib.org/primary/p/216947/

Nguyen, K. D., & Rahman, M. A. (2018). User interface design considerations for next generation learning management systems. In *2018 International Conference on Computational Science and Computational Intelligence (CSCI)*, 607-612. https://doi.org/10.1109/CSCI46756.2018.00122

Olmeda-Torre, N., Martínez, M. M., & Peña, M. (2021). Effectiveness of blended instructional design based on active learning in graphic engineering course. *Computer Applications in Engineering Education*, *29*, 810-837. https://doi.org/10.1002/cae.22338

O'Connell, S. D., & Lang, G. (2018). Can personalized nudges improve learning in hybrid classes? Experimental evidence from an introductory undergraduate course. *Journal of Research on Technology in Education*, *50*(2), 105-119. https://doi.org/10.1080/15391523.2017.1408438

Oreopoulous, P. (2021). Nuding and shoving students toward success: What the research shows about the promise and limitations of behavioral science in education. *Education Next*, *21*(2), 8-13.

Pal, P. R., Leach, L., & Mayfield, C. (2020). Hybrid learning across borders: Designing courses for online and local learning. In T. J. Bastianens & G. H. Marks (Eds.), *Proceedings of Innovate Learning Summit 2020* (pp. 221- 227). Association for the Advancement of Computing in Education (AACE). https://www.learntechlib.org/primary/p/218805/

Pappas, C. (2015, October 8). The history of blended learning. eLearning Industry. https://elearningindustry.com/history-of-blended-learning

Pilcher, S. C. (2017). Hybrid course design: A different type of polymer blend. *Journal of Chemical Education*, *94*, 1696-1701. https://doi.org/10.1021/acs.jchemed.6b00809

Ralston-Berg, P., & Braatz, H. (2021). Online course design structure and interface. *New Directions for Adult and Continuing Education*, *2021*, 15-33. https://doi.org/10.1002/ace.20411

Robinson, D. E., & Wizer, D. R. (2016). Universal design for learning and the Quality Matters guidelines for the design and implementation fo online learning events. *International Journal of Technology in Teaching and Learning*, *12*(1), 17-32.

Rodriguez, M. E., Guerrero-Roldán, A. E., Baneres, D., & Karadeniz, A. (2022). An intelligent nudging system to guide online learners. *International Review of Research in Open and Distributed Learning*, *23*(1), 41-62. https://doi.org/10.19173/irrodl.v22i4.5407

Ross, D. N., & Rosenbloom, A. (2011). Reflections on building and teaching an undergraduate strategic management course in a blended format. *Journal of Management Education*, *35*(3), 351-376.https://doi.org/10.1177/1052562911398979

Sadaf, A., Martin, F., & Ahlgrim-Delzell, L. (2019). Student perceptions of the impact of quality matters-certified online courses on their learning and engagement. *Online Learning*, *23*(4), 214-233. https:/doi.org/10.24059/olj.v23i4.2009

Saichaie, K. (2020). Blended, flipped and hybrid learning: Definitions, developments, and directions. *New Directions for Teaching and Learning*, *2020*(164), 95-104. https://doi.org/10.1002/tl.20428

Selinger, E., & Whyte, K. (2011). Is there a right way to nudge? The practice and ethics of choice architecture. *Sociology Compass*, *5*, 923-935. https://doi.org/10.1111/j.1751-9020.2011.00413.x

Shand, K., & Glassett Farrelly, S. (2017). Using blended teaching to teach blended learning: Lessons learned from pre-service teachers in an instructional methods course. *Journal of Online Learning Research*, *3*(1), 5-30. https://www.learntechlib.org/primary/p/172566/

Shannahan, J., & Fredericks, V. (2022). Transitioning into and improving online history teaching. *The Journal of Classics Teaching*, *23*, 138-146. https://doi.org/10.1017/S2058631022000046

Shea, J., Joaquin, M. E., & Gorzycki, M. (2015). Hybrid course design: Promoting student engagement and success. *Journal of Public Affairs Education*, *21*(4), 539-556. https://www.jstor.org/stable/24615544

Shea, J., Joaquin, M. E., & Wang, J. Q. (2016). Pedagogical design factors that enhance learning in hybrid courses: A contribution to design-based instructional theory. *Journal of Public Afairs Education*, *22*(3), 381-397. https://www.jstor.org/stable/44114744

Shin, S., & Cheon, J. (2019). Assuring student satisfaction of online education: A search for core course design elements. *International Journal on E-Learning*, *18*(2), 147-164.

Simunich, B., Robins, D. B., & Kelly, V. (2015). The impact of findability on student motivation, self-efficacy, and perceptions of online course quality. *American Journal of Distance Education*, *29*(3), 174-185. https://doi.org/10.1080/08923647.2015.1058604

Sorgenfrei, C., & Smolnik, S. (2016). The effectiveness of e-learning systems: A review of the empirical literature on learner control. *Decision Sciences Journal of Innovative Education*, *14*(2), 154-184.

Sowan, A. K., & Jenkins, L. S. (2013). Use of the seven principles of effective teaching to design and deliver an interactive hybrid nursing research course. *Nursing Education Perspective*, *34*(5), 315-322.

Sunstein, C. R. (2015). *Which nudges do people like? A national survey.* Social Science Research Network. https://dx.doi.org/10.2139/ssrn.2619899

Sunstein, C. R. (2016). *The ethics of influence: Government in the age of behavioral science*. Cambridge University Press.

Szaszi, B., Palinkas, A., Palfi, B., Szollosi, A., & Aczel, B. (2018). A systematic scoping review of the choice architecture movement: Toward understanding when and why nudges work. *Journal of Behavioral Decision Making*, *31*, 355-366. https://doi.org/10.1002/bdm.2035

Thaler, R. H. & Sunstein, C. R. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. Yale University Press.

Tomas, L., Evans, N., Doyle, T., & Skamp, K. (2019). Are first year students ready for a flipped classroom? A case for a flipped learning continuum. *International Journal of Educational Technology in Higher Education*, *16*(5). https://doi.org/10.1186/s41239-019-0135-4

Tyczynski, D., & Mark, T. (2021). Consistency is the key to survival: LMS design principles in an online lower limb anatomy course. *Academic Confrences International Limited*, 480-485. https://doi.org/10.34190/EEL.21.041

van Oldenbeek, M., Winkler, T. J., Buhl-Wiggers, J., & Hardt, D. (2019). Nudging in blended learning: Evaluation of email-based progress feedback in a flipped-classroom information systems course. *Proceedings of the 27th European Conference on Information Systems, Sweden*. https://aisel.aisnet.org/ecis2019_rp/186.

Weijers, R. J., de Koning, B. B., & Paas, F. (2021). Nudging in education: From theory towards guidelines for successful implementation. *European Journal of Psychology of Education*, *36*, 883-902. https://doi.org/10.1007/s10212-020-00495-0

Young, M. R. (2014). Integrated Quality Matters into hybrid course design: A principles of marketing case study. *Journal of Marketing Education*, *36*(3), 233-243. https://doi.org/10.1177/0273475314547821