Hybrid, Blended, Flipped, and Inverted: Defining Terms in a Two Dimensional Taxonomy

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ABSTRACT

The terms hybrid, blended, flipped, and inverted are inconsistently defined in the literature creating a barrier to efficient research on and implementations of these types of classes. This paper examines existing definitions of these new types of courses and uses those definitions to identify two dimensions critical to differentiating types of courses: how instruction is delivered to students and what type of instruction students receive. The paper then addresses how these dimensions were used to create a taxonomy that defines hybrid, blended, flipped, and inverted classrooms. The taxonomy focuses on learning experiences in which students receive instructional guidance either directly from an instructor or indirectly from an instructional designer (e.g., through educational software); therefore, some elements of courses, such as unmonitored problem solving, are not specified.

INTRODUCTION

Educators have been adapting their courses by using computing technology to promote student engagement (e.g., by using online simulations), make course content more accessible (e.g., by using video conferencing), and much more. The increasing use of technology impacts students' learning experiences, especially how students receive instruction and what type of instruction they receive. In some cases, the experience of learners had changed so drastically that it became necessary to create a new name to describe the course (i.e., hybrid, blended, flipped, and inverted). Much research has been conducted in the past few years to assess the effectiveness of these new types of courses. In this literature, researchers inconsistently use these terms to describe the type of course that they are evaluating, causing ideas and discussion in the literature to be unclear.

Many researchers use the terms hybrid and blended interchangeably. In three of the first five articles found in a search for "blended" (using the ERIC database on 13 September 2013), the terms blended and hybrid are represented as the same concept (Calderon, Ginsberg, & Ciabocchi, 2012; Dikmenli & Unaldi, 2013; Gecer & Dag, 2012; Owston, York, & Murtha, 2013; Pregot, 2013). This result suggests that some researchers use blended and

hybrid to represent the same concept while some do not (or perhaps are not aware of the term hybrid). Additionally, the term flipped is indistinguishable from the term inverted in the literature, but some researchers use flipped and some use inverted (e.g., Bishop & Verleger, 2013; Morin, Kecskemety, Harper, & Clingan, 2013; Strayer, 2012).

Inconsistent definitions of hybrid, blended, flipped, and inverted classrooms cause these terms to be confused and wastes the time of researchers and practitioners interested in studying and implementing these types of courses. The inconsistencies make comparing results, replicating experiments, and finding and deeply understanding information from the research difficult. For example, imagine the theoretical and pragmatic repercussions if the terms *secondary* and *higher* education were used interchangeably. To address this issue, we propose a taxonomy that considers critical dimensions of courses and consistently defines these terms by these dimensions.

Identifying Dimensions from Existing Definitions

To identify the relevant dimensions for defining these courses, we qualitatively analyzed a sample of previous definitions of hybrid, blended, flipped, and inverted classrooms (see Table 1) using techniques described in Taylor-Powell and Renner (2003) to find the emergent dimensions. We identified four primary dimensions:

1. *Instructional location* describes whether the learner receives instruction in a classroom or in a non-traditional setting (e.g., home, library, coffee shop),
2. *Delivery medium* describes whether a person or technology delivers instruction to the learner,
3. *Instruction type* describes whether the learner is receiving content (e.g., lecture) or applying content to learning activities (e.g., practice problems), and
4. *Synchronicity* describes whether learners are following a group pace or individual pace.

Then each definition in the sample was scored by two raters on whether it included information about the dimensions. The initial interrater agreement was 92%. Then, raters discussed disagreements until they reached full agreement. The dimensions of the definitions are represented in Table 2.

Article	Term	Definition
Sands, 2002	Hybrid	"…hybrid course, seat time is reduced and some of the course activities—information transfer, exchange of ideas, testing, essay-writing, etc.—are distributed throughout the semester, with students accessing course materials and performing other tasks online."
Johnson, 2012, pp. 94	Hybrid	"Hybrid classes have required amounts of physical attendance, but some of that attendance requirement is replaced by online work."
Arispe & Blake, 2012, pp. 450	Hybrid	"We will use the *hybrid* to refer to courses that regularly combine scheduled classroom sessions with online meetings."
Allen & Seaman, 2010, pp. 5	Hybrid and Blended	"Course that blends online and face-to-face delivery. Substantial proportion [30-79%] of the content is delivered online…and typically has a reduced number of face-to-face meetings."
Singh & Reed, 2001, pp. 2	Blended	"Blended learning focuses on optimizing achievement of learning objective by applying the "right" learning technologies to match the "right" personal learning style to transfer the "right" skills to the "right" person at the "right" time."
Garrison & Vaughn, 2008, pp. 5	Blended	"The basic principle is that face-to-face oral communication and online written communication are optimally integrated…"
Johnson, 2012, pp. 94	Blended	"Blended classes meet face-to-face full time like regular classes but are augmented by formal, extensive online resources."
Johnson, 2012, pp. 94	Flipped	"One model of a blended classroom is the flipped classroom, in which students access the curricular content outside of class and then use class time to discuss, apply, and clarify the content."
Carpenter & Pease, 2012, pp. 37	Flipped	"Flipping describes a model [in which] ... At home, students watch online lectures, while class time is spent on…processing activities. The teacher, freed from front-of-class lecturing, works more intensively with individuals and groups of students."
Morin, Kecskemety, Harper, & Clingan, 2013	Flipped and Inverted	"The inverted classroom "flips" the in-class and out-of-class activities, often by moving the lecture content before class and working on homework and hands-on activities during class time."
Bishop & Verleger, 2013	Flipped and Inverted	"the flipped classroom…employs asynchronous video lectures and practice problems as homework, and active, group-based problem solving activities in the classroom."
Strayer, 2012	Inverted	"[Inverted classrooms] rely on technology to introduce students to course content outside of class so that students can engage that content at a deeper level inside the classroom."
Lage, Platt, & Treglia, 2000, pp. 32	Inverted	"Inverting the classroom means that events that have traditionally take place inside the classroom now take place outside the classroom and vice versa"

Table 1. List of Previous Definitions of Hybrid, Blended, Flipped, and Inverted. Sample definitions were selected from a range of publication dates (i.e., 2000-2013) and publication types (e.g., empirical articles, books, magazines). Definitions that are cited frequently, such as those by Lage et al. (2000) and Allen and Seaman (2010), were also included.

Table 2 illustrates the dimensions that are used to describe hybrid, blended, flipped, and inverted classrooms. Definitions of hybrid courses consistently describe instructional location; definitions of blended courses consistently describe delivery medium; definitions of flipped and inverted courses consistently describe instructional location and instruction type. These patterns suggest which dimensions are important to defining these terms.

Flipped/inverted courses are widely considered to be a type of blended learning (e.g., Johnson, 2012; Strayer, 2012); therefore, it seems contrary that flipped/inverted courses and blended courses are not defined by the same dimensions. To explore this discrepancy, the instructional location and delivery medium dimensions were examined more closely. Because these two dimensions discuss the same type of learning experiences (e.g., face-to-face or online) from different perspectives, these dimensions seem to address the same issue: how learners receive instruction. To reduce redundancy, we propose that these two dimensions be represented by a single dimension.

We think that how instruction is delivered is more descriptive of learning experiences than the physical environment in which instruction is received. If instruction is delivered via an instructor, then it is implied that the learner and instructor are face-to-face. On the other hand,

Article	Term	Location of Instruction	Delivery of Instruction	Type of Instruction	Synchronicity of Instruction
Sands, 2002	Hybrid	x	x	x	
Allen & Seaman, 2010	Hybrid	x	x		
Johnson, 2012	Hybrid	x			
Arispe & Blake, 2012	Hybrid	x			
Singh & Reed, 2001	Blended		x	x	x
Garrison & Vaughn, 2008	Blended		x		
Allen & Seaman, 2010	Blended	x	x		
Johnson, 2012	Blended	x	x		
Carpenter & Pease, 2012	Flipped	x	x	x	
Johnson, 2012	Flipped	x		x	
Bishop & Verleger, 2013	Flipped	x	x	x	x
Morin et al., 2013	Flipped	x		x	
Lage et al., 2000	Inverted	x		x	
Strayer, 2012	Inverted	x	x	x	
Bishop & Verleger, 2013	Inverted	x	x	x	x
Morin et al., 2013	Inverted	x		x	

Table 2. List of Previous Definitions of Hybrid, Blended, Flipped, and Inverted Characterized by Their Underlying Dimensions.

if instruction is delivered via technology, then the location of the student can be anywhere that has an internet connection, including a classroom. Delivering instruction via technology is beneficial because it affords flexibility in instruction on a variety of factors including location, pace, and style (Gedik, Kiraz, & Ozden, 2013; Singh & Reed, 2001). Given the mobility of modern technology, specifying how instruction is delivered to students rather than where instruction is delivered might be more a useful dimension for defining courses.

In the sample of definitions, describing the synchronicity of instruction was not common. Instruction can be synchronous or asynchronous regardless of whether it is delivered in class or online, via an instructor or technology, or for lecture or application activities. For this reason, synchronicity could be considered a product of the instructional method. For example, learners watch online video lectures individually, so instruction is asynchronous. For another example, learners watch a live lecture in class with an instructor, so instruction is synchronous. Though synchronicity is an important factor in learning experiences, we propose that synchronicity is not a defining dimension of courses.

Dimensions Used in Taxonomy

Two dimensions were used for defining courses: delivery medium and instruction type. Delivery medium is defined as the medium through which instruction is delivered to the learner. The two main types of delivery media are via an instructor and via technology, so they will be the end points of this dimension (see Figure 1). Delivery via an instructor implies that the learner receives instruction in a face-to-face environment, whereas delivery via technology makes no assumptions about the physical environment of the student. Instead, technology-delivered instruction allows for flexibility in the learning experience. For example, the physical location of the learner is flexible in a class that meets synchronously via a video conference. For another example, the pace of the instruction is flexible when learners individually watch a video recorded by their instructor.
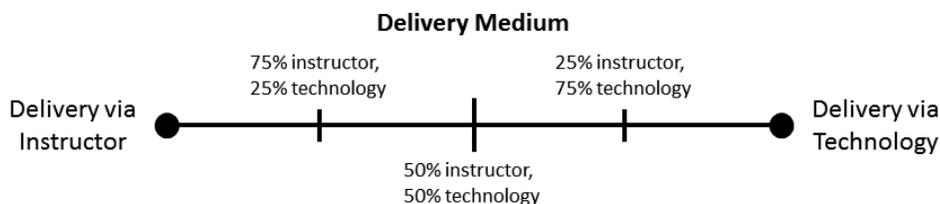
Figure 1. Delivery medium dimension of learning experiences ranging from 100% delivery via an instructor to 100% delivery via technology.
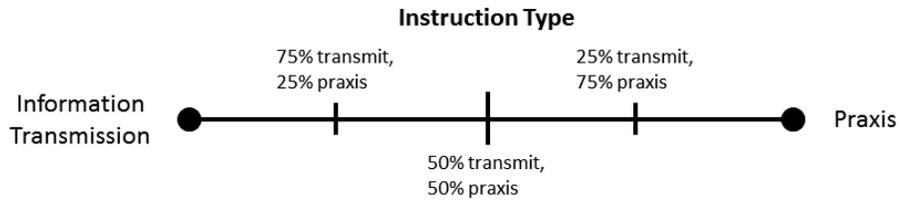
Figure 2. Instruction type dimension of learning experiences ranging from 100% information transmission to 100% praxis.

The dimension of instruction type is defined by the roles that the students and instructors take during instruction. The two main types of instruction are information transmission and praxis, so they will be the end points of this dimension (see Figure 2). Information transmission is defined as instructor-driven delivery of content to the learner (Gonzales, 2012). During information transmission, the instructor or instructional program dictates information while the student receives information. Examples of information transmission are lectures and educational videos. Praxis, on the other hand, is defined as student-driven learning through the application of knowledge (Singh, 2012). During praxis, the student applies knowledge while the instructor or program supports the student by providing guidance and feedback. Examples of praxis are experiential learning and discussions.

The delivery medium and instruction type dimensions are independent and can be used to differentiate types of courses, such as hybrid and blended classrooms, and create consistent definitions for them. We use these dimensions to form the structural foundation of the Learning Experiences Taxonomy (see Figure 3). The taxonomy focuses on learning experiences in which instructors interactively guide students for the purpose of acquiring new knowledge. This guidance addresses, among other things, the credibility of content, how to organize knowledge, the progress of the student, strategies for problem solving. Therefore, the taxonomy does not specify learning activities that are entirely student-directed. For example, it does not include unmonitored peer discussion (i.e., face-to-face or online) or the unguided use of the Internet to look up additional information. It also does not include assignments on which students receive delayed feedback such as homework assignments that students complete independently.
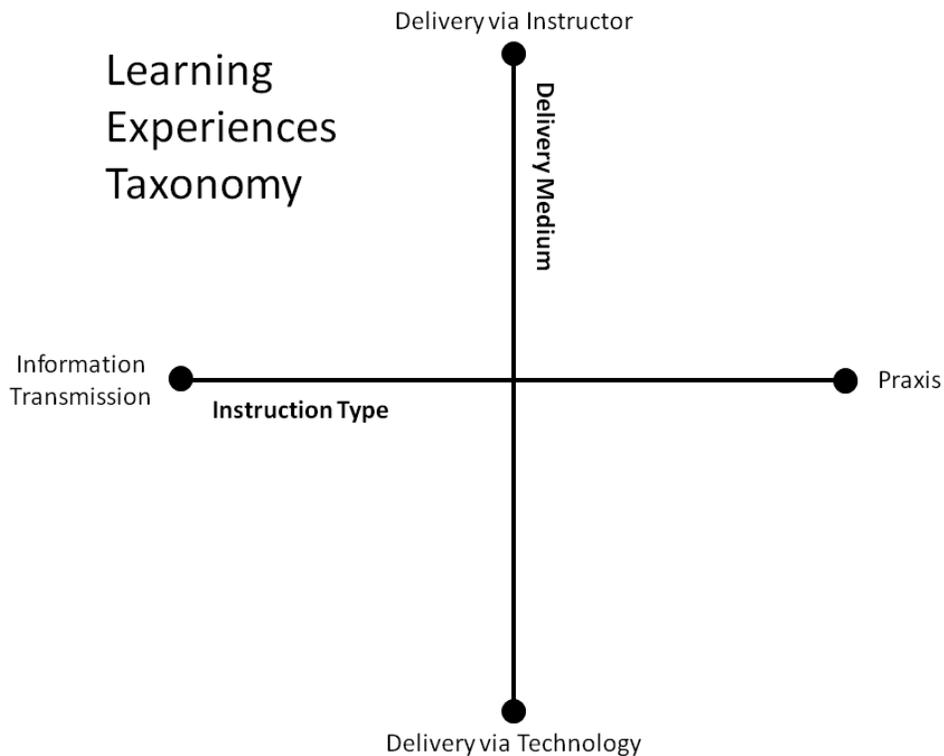

Figure 3. Delivery medium and instruction type dimensions orthogonally crossed to form the structural foundation for Learning Experiences Taxonomy.

The Fundamental Learning Experiences

The dimensions form four quadrants, and these quadrants represent the four fundamental learning experiences in the taxonomy (see Figure 4). The following sections define each of the four quadrants and offer two examples of classes, one in the science domain (i.e., chemistry) and one in the humanities domain (i.e., history).

Instructor-transmitted describes the top, left quadrant in which courses are primarily delivered via instructor and information transmission. In the examples below, the only instructional guidance that students receive is through watching or listening to their instructor.

Example Chemistry Class	Example History Class
During class, students watch demonstrations of lab procedures performed by their instructor.	During class, students listen to the instructor lecture.

Technology-transmitted describes the bottom, left quadrant in which courses are primarily delivered via technology and information transmission. In the examples below, the only instructional guidance that students receive is through watching videos.

Example Chemistry Class	Example History Class
During class, students watch videos of demonstrations of lab procedures selected by the instructor.	There is no face-to-face class. Students individually listen to pre-recorded lectures by the instructor.

Instructor-mediated describes the top, right quadrant in which courses are primarily delivered via instructor and praxis (i.e., the student applies knowledge with an instructor who provides guidance and feedback). In the examples below, the students receive feedback on their progress from the instructor during class.

Example Chemistry Class	Example History Class
During class, students use lab equipment to complete assignments.	During class, students discuss readings and ideas.

Technology-mediated describes the bottom, right quadrant in which courses are primarily delivery via technology and praxis (i.e., the student applies knowledge using technology that provides guidance and feedback). In the examples below, the online program and video game are providing feedback to the students about how well they are applying knowledge.

Example Chemistry Class	Example History Class
Students work through lab assignments using an online lab simulator.	Students play through an educational video game by answering questions.

The examples given for these fundamental learning experiences use only one type of delivery and one type of instruction; therefore, they would all be located at the outer corners of the taxonomy. Many courses, however, use a combination of delivery media and instruction types
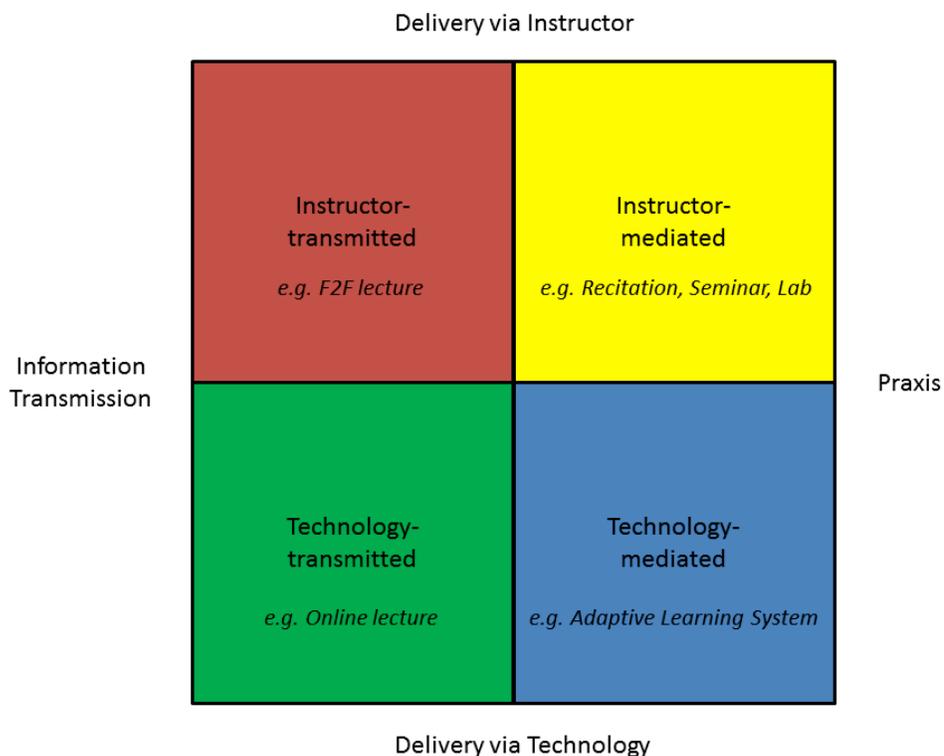

Figure 4. Fundamental learning experiences form the four quadrants of the taxonomy.

resulting in a course that would fall more towards the center of the taxonomy. For example, if a course was delivered via an instructor but half information transmission and half praxis, then, it would be in the middle of the top edge of the taxonomy. A course like this could not be accurately categorized by one the four fundamental learning experiences. In the taxonomy, courses are only classified by the four fundamentals if they do not use a substantial portion (more than 25%) of the pedagogical elements from other quadrants. Courses that use a substantial portion of two fundamental learning experiences are called combined learning experiences.

The Combined Learning Experiences

The taxonomy has four combined learning experiences: one for each combination of adjacent quadrants (see Figure 5). Though hybrid and blended are often confounded (e.g., Allen & Seaman, 2010), in discriminating definitions, hybrid is used to describe courses that are simply part face-to-face and part online (e.g., Arispe & Blake, 2012; Johnson, 2012; Sands, 2002). For this reason, the taxonomy uses hybrid to describe courses that combine delivery via an instructor and delivery via technology.
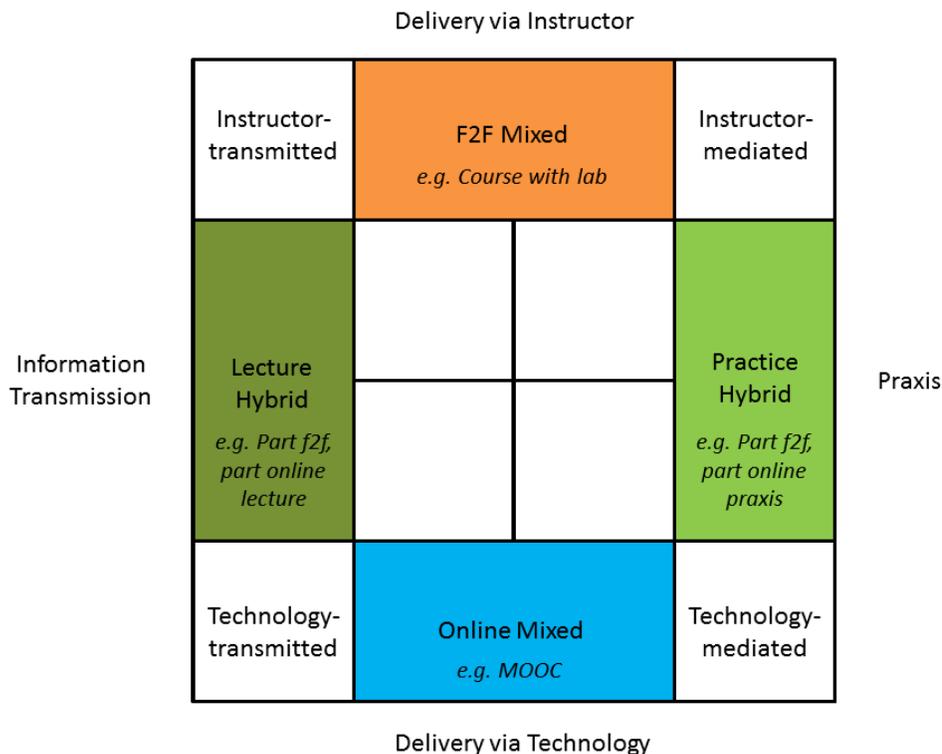

Figure 5. Combined learning experiences include a substantial portion (25% to 75%) of methods from two adjacent fundamental learning experiences.

Lecture hybrid describes the combination between instruction-transmitted and technology-transmitted experiences. In lecture hybrid courses, the student receives information partially via an instructor and partially via technology. In the examples below, information is being transmitted to the students via both delivery media. For the technology-delivered portion, sometimes students watch the delivery synchronously (i.e., live lecture), and sometimes they watch it asynchronously.

Practice hybrid describes the combination between instructor- and technology-mediated experiences. In practice hybrid courses, the student applies knowledge with guidance and feedback partially via an instructor and partially via technology. In the examples below, students apply knowledge with feedback via both delivery media. For the technology-delivered portion, sometimes students receive feedback from a program, and sometimes they receive feedback from their instructor virtually.

Example Chemistry Class	Example History Class
Students listen to live lectures sometimes face-to-face and sometimes online.	Students attend class once a week to listen to the instructor lecture, and the rest of the week, they watch videos.

Example Chemistry Class	Example History Class
Students attend lab once a week to conduct experiments. Then, they participate in discussions in online forums that the instructor moderates.	Students use an intelligent tutoring system to build problem solving skills. In class, students solve large problems as a group.

To the authors' knowledge, there is not a common term to describe courses that combine information transmission and praxis. In this taxonomy, the term mixed will be used to describe these experiences. *Face-to-face (F2F) mixed* describes the combination between instruction-transmitted and instructor-mediated learning experiences. In F2F mixed courses, the students receive information from and apply knowledge with guidance from an instructor. In the examples below, the students receive information from the instructor then apply their knowledge while the instructor is available to provide guidance and feedback.

Example Chemistry Class	Example History Class
For part of class time, students watch demos of procedure, and during the other time, they work on a lab assignment.	For part of class time, students listen to the instructor lecture, and during the other time, they discuss readings and ideas.

Online mixed describes the combination between technology-transmitted and technology-mediated learning experiences. In online mixed courses, the students receive information from and apply knowledge with guidance from technology. In the examples below, the students use technology to receive knowledge and receive feedback while applying their knowledge.

Example Chemistry Class	Example History Class
Students watch demos selected by the instructor, and they use an online lab simulation to work on lab assignments and get computer-generated feedback on their work.	Students watch videos selected by the instructor, and they participate in discussions in online forums monitored by the instructor.

The Blended Learning Experiences

The middle of the taxonomy is called the blended learning experience, and it uses a substantial portion (between 25% and 75%) of delivery via an instructor, delivery via technology, information transmission, and praxis (see Figure 6). We chose blended to represent this area in the taxonomy because of how the term flipped is used in the literature. Flipped is indistinguishable from inverted in the literature, but this paper uses flipped because it is more common. A flipped classroom is generally considered to be a type of blended learning (e.g., Johnson, 2012), and central to its definition is how different types of instruction are delivered to students (see Table 2). Given flipped classes are a type of blended classroom, then other types of blended learning should also be defined by both how instruction is delivered and what type of instruction students receive.
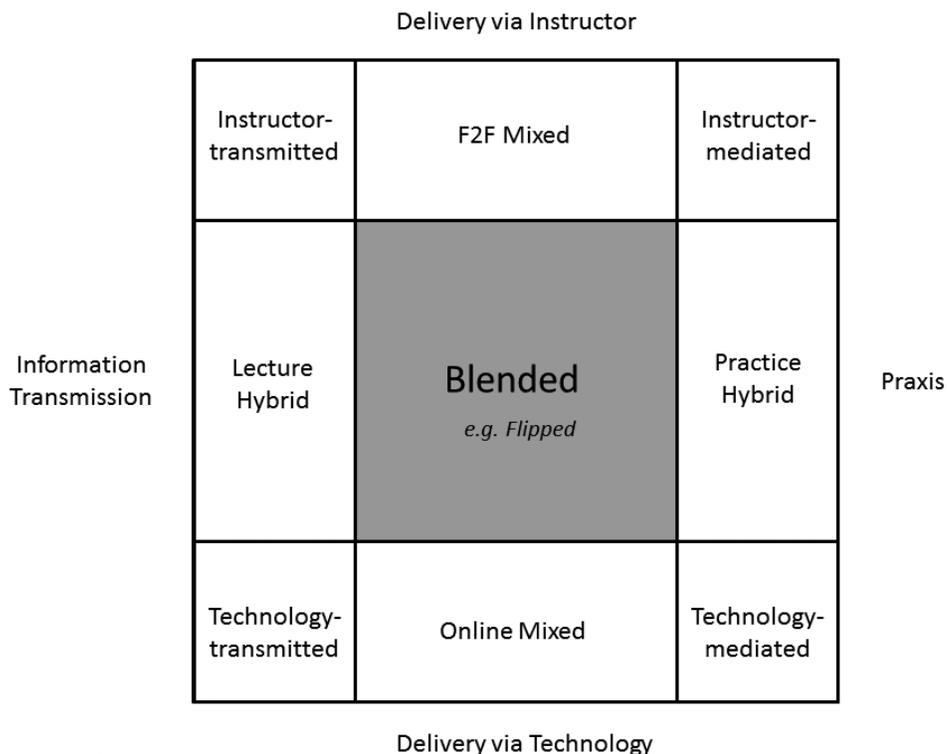
Delivery via Instructor

Figure 6. Blended learning experiences include a substantial portion (25% to 75%) of teaching methods from both delivery media (i.e., delivery via instructor and delivery via technology) and both instruction types (i.e., information transmission and praxis).

There are many possible types of blended courses that can be defined by the taxonomy by blending the fundamental and combination learning experiences. For example, flipped classes are those in which students receive content from technology (i.e., technology-transmitted) and apply knowledge with help from an instructor (i.e., instructor-mediated). For another example, a course would be considered blended if it were any combination of the combined learning environments. Types of blended learning are not included in the current nomenclature of the taxonomy, but they can be defined, like flipped has been, using terms from the taxonomy.

Conclusion

Given the number of papers evaluating hybrid, blended, flipped, and inverted classrooms (e.g., there were 10 papers on flipped/inverted classes at the American Society of Engineering Education conference in 2013 alone) and the inconsistent use of terms in the recent literature, a taxonomy for courses is necessary. The proposed Learning Experiences Taxonomy (see Figure 7) aims to provide consistent terms for those discussing different types of courses. Although the impetus for the taxonomy was to differentiate hybrid, blended, flipped, and inverted classes, the scope of the taxonomy includes other types of courses. The definitions used in the taxonomy took into consideration previous definitions from the literature, so implementing these definitions should not cause undue confusion. Although detailed descriptions of a particular course in a study will always be necessary in the literature, classifying courses by the terms used in the taxonomy can help researchers and practitioners find information about specific types of courses.
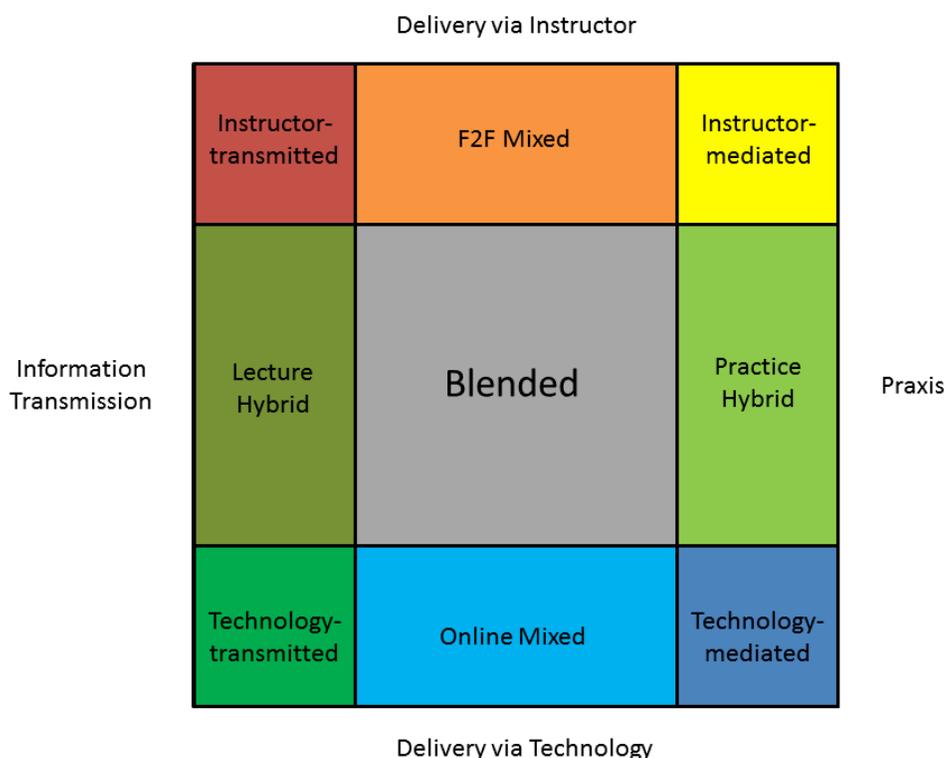

Figure 7. The Learning Experiences Taxonomy provides terminology to consistently categorize courses in which students have guidance via an instructor or technology.

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