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Writing Measurable Learning Objectives to Aid Successful Online Course Development

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Abstract
Quality learning objectives play an important role in the course development process. However, the challenges of time, terminology, and constructive alignment often dissuade faculty from writing quality learning objectives. The authors surveyed online faculty members (n= 61) about their overall use of learning objectives, the point at which they use them, the degree to which they perceive their ability to write quality learning objectives, and the degree to which those surveyed demonstrate the writing of quality learning objectives.
The results indicated that the majority of faculty surveyed attempt writing and have a desire to use quality learning objectives. The authors discuss possible solutions for supporting faculty in the development and use of quality learning objectives.

Keywords: Objectives, Online

Introduction

The deliberate process of course design is a cornerstone in the creation of quality courses. The process is ultimately important due to the extensive preparation required in the development process of online courses. An understanding of structure and alignment plays a key role in the construction of that foundation. A primary building block of course design is the learning objective. Dick, Carey and Carey (2005) suggest that quality learning objectives be implemented throughout the lifecycle of the course. Writing high quality learning objectives is often stifled for one of or a combination of the following four reasons: lack of time, unfamiliar terminology, understanding the need to implement good learning objectives, and knowing how to incorporate constructive alignment of learning objectives. This paper will review how to write a quality learning objective, and it will discuss the results of a recent learning objective-related faculty-facing survey. The survey included questions related to how faculty currently perceive the importance of learning objectives and what process faculty use for writing learning objectives.

Let's begin by reviewing why each of the four areas mentioned above provide reasons as to why writing quality learning objectives can be so difficult.

Literature review

Time

Despite their importance, taking the time to write quality learning objectives can be a cumbersome process. Complicating the time factor is the idea that many faculty struggle with the conceptualization and mechanics of creating quality learning objectives. Kemp, Morrison, and Ross (2003) suggest that

instructors may shy away from developing well-defined learning objectives possibly because formulating them requires a considerable amount of thought and effort both of which take extra time that faculty members may not have. Furthermore, faculty are accustomed to freedom in instructional planning. Therefore, the exactness and boundaries that come with course development based on learning objectives is somewhat foreign and possibly seen as a somewhat futile and time consuming undertaking.

Terminology

Bostwick and Yokomoto (1999) suggest that educational terminology can be an impediment to creating high quality learning objectives and may play a role in the struggle faculty have with learning objective development. For faculty without a degree in education where the creation of high quality learning objectives is taught and reinforced, how words such as *goals*, *outcomes*, *objectives*, *program objectives*, *instructional objectives, performance objectives, behavioral objective, course outcomes, measurable, and learning outcomes* in this instance are used may be unfamiliar to them. Further adding to the confusion about how and when to apply objectives, these terms are used interchangeably in settings outside of education even though they have distinct meanings when applied to writing learning objectives.

Understanding the need for learning objectives

Biggs (2003) suggests that learning objectives play a significant role beyond basic course development. On a programmatic curricular level, learning objectives can align in such a manner that student success throughout the curriculum of a specific program can be tracked in comparison to the expected student learning outcomes. Optimal alignment shows congruence between learning outcomes and assessments. Biggs (2003) describes this optimal alignment as *constructive alignment*. If faculty and course designers create and implement appropriate learning objectives within their courses, these objectives will effectively guide students for the duration of the course, and if done well, for the duration of their academic program.

Constructive alignment

There is no question that course-learning activities should be directly tied into the learning outcomes. As the concept of constructive alignment implies, however, learning outcomes should also be tied into an institutional goal (Biggs and Tang, 2011). Diamond (2008) states that "as we teach our courses, we tend to lose sight of the fact that each course is but one element in a learning sequence defined as a curriculum" (p.83). This statement suggests that faculty may not always think on an institutional level when considering objectives for a particular course. Providing faculty with a holistic view of institutional goals will help achieve constructive alignment; however, this is also based on faculty understanding of the academic mission of the institution. Furthermore, institutional constructive alignment can only be optimally achieved when faculty are aware of the various levels in the institutional hierarchy where learning outcomes should exist. Bostwick and Yokomoto (1999) created a pyramid diagram that visually depicts the different layers of goals from the university mission down to individual course objectives. Soulsby (2009) expanded the pyramid depicted by Bostwick and Yokomoto by redesigning the base of the pyramid to differentiate course outcomes from objectives. Figure 1 below illustrates Soulsby's update of Bostwick and Yokomotos' outcomes pyramid. Filling in each category helps to provide an overall picture and constructive alignment so needed for cohesiveness of learning objectives and overall student success.

Figure 1. Soulsby's (2009) conceptual outcome pyramid version of Bostwick & Yokomoto's (1999) pyramid

Outcomes vs objectives

Once constructive alignment has been achieved, more energy can be focused on creating specific learning objectives. As stated earlier, a barrier faculty may encounter that hinders their ability to write quality learning objectives may be the related terminology itself (Bostwick & Yokomoto, 1999). Terms that are often used interchangeably are learning *outcomes* and learning *objectives*. Though related, the terms *outcomes* and *objectives* should not be deemed synonymous. For the purpose of this research study, the researchers used the definition of learning *outcomes* and learning *objectives* provided by Dick and Reiser (1989) and Mager (1962) respectively. Learning outcomes are defined as general statements about what the learner will be able to do as a result of instruction (Dick & Reiser, 1989). By contrast, a learning objective is a description of an optimal performance learners are expected to be able to exhibit before they are considered competent in meeting the learning outcome (Mager, 1962). Essentially, the outcome describes the knowledge the learner is expected to obtain, while the objective describes how the learner will demonstrate that they have obtained that knowledge.

Preferably, the relationship between learning outcomes and learning objectives is symbiotic. Within a linear instructional design model, outcomes should not exist without objectives and vice versa. Within the design process, learning outcomes should be created before learning objectives. Once learning outcomes are established, learning objectives that are directly associated with these specific outcomes should be built. The alignment between the outcomes and the objectives should be shared with the course designer, if available, for valuable input. Consider the following example of a misaligned learning outcome and learning objective proposed by Dick & Reiser (2008): "The learning outcome is developing lifelong health habits and the associated learning objective is listing the major bones in

the leg,"(p. 23). Although both the outcome and the objective both fall under the content area of *Health and the Human Body*, the listing of the major bones in the leg would not be an appropriate performance to assess whether or not learners would be able to develop lifelong health habits.

Quality learning objectives

The importance of quality learning objectives has been well established on both a course and institutional level. The question remains, what constitutes *quality* in a learning objective? Mager (1984) proposes that there are three elements of a quality learning objective: performance, condition, and criterion. The performance is what the learner is expected to do or the result of the instruction. The condition describes the circumstances in which the performance should occur. The criterion establishes the minimum threshold of acceptable performance. Furthermore, an objective should clearly express an observable behavior that students are expected to perform in order to indicate achievement (Dick & Reiser, 1989). Orelove (2001), stated that when a goal includes the absence of performance on the part of a student it also lacks quality. For example, *Johnny will sit quietly for 20 minutes* or *By the end of the course, students should know historically important dates in history* (p. 4). Neither of these examples requires observable activity or quality performance on the part of the students. In addition, neither goal is measurable. According to Benjamin Bloom objectives should be measurable and serve to help create a structure for hierarchically classifying the measurability of learning objectives (Bloom, Engelhart, Furst, & Krathwohl, 1956; Anderson & Krathwohl 2001).

Overall, well-structured objectives provide multiple advantages for faculty during course design. Objectives provide a criterion by which students can be assessed, provide clear direction by which to build appropriate learning activities, and ensure alignment from planning to implementation. Without objectives, courses tend to have nebulous assignments and activities, which leads to nebulous outcomes (Mager, 1997). In short, students will likely reach an outcome, but the validity of the reached outcome may be questionable.

Learning objectives and course design

Ideally, learning outcome and objective development occurs early in the course design process. The outcomes and objectives serve as a roadmap throughout the lifecycle of a course. Dick, Carey, and Carey (2005) reinforce this notion by stating that content selection, assessment strategies, and instructional strategies should all directly align with objectives that guide the entire process. Dick and Reiser (1989) denote objectives as the lens by which faculty base their assessment of student progress. It is evident that students have progressed when they reach the outcome. Furthermore, faculty can clearly see how much further the student needs to travel when the outcome has not been reached. Kemp, Morrison, and Ross (2003) view objectives as a foundational piece of the course design process. Objectives serve to focus the overall plan, provide a framework by which to create assessments that are well aligned to instruction, and clarify for the learner exactly what it is they are supposed to master by way of the instruction.

Although there is some variance of thought as to whether or not to present the objectives to the students before or during instruction, or present them at all, objectives are critical to the design of instruction. Equally critical is that faculty know how to write quality learning objectives. The ability to infuse quality objectives into the overall course design process is essential in the creation of a well-aligned course. In order to help faculty with that process, the authors have developed the following framework, called the D4 - Destination, Design, Delivery, and Distance (Figure 2).

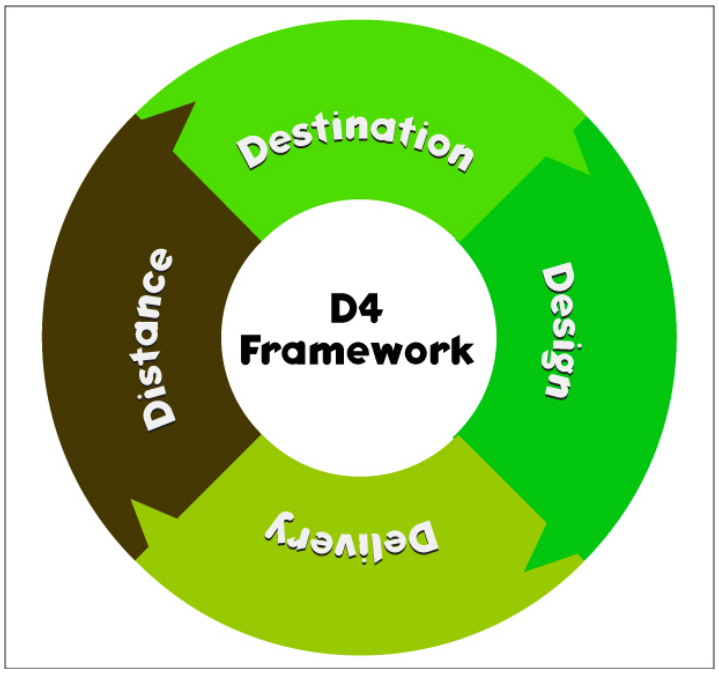

Figure 2. D4 framework for incorporating objectives in the course design process

The D4 framework shown in Figure 2 provides a guide for course development and consists of four D's: Destination, Design, Delivery, and Distance. The Destination is simply where the faculty member wants the student to arrive by the end of the course. The course and module objectives are included in the Destination portion of the framework with the course objectives being the final destination and the module objectives being checkpoints along the way. The Design includes the alignment of content choices, assessment methods, instructional strategies, and any other method or strategy that is meant to guide students toward the destination. The Design should always derive from the Destination. The Delivery include the modalities (e.g., face-to-face, hybrid, or fully-online course environment) by which the Design aspects will be delivered. The Distance refers to the journey of the student. Did the student reach the Destination, and if not, what is their distance from that destination? The D4 framework is cyclical in nature as faculty should continue to guide their students who have not yet reached the intended destination by way of good Design, Delivery, and reassessment of the Distance to the Destination. The entire cyclical process is one where the faculty member is required to facilitate the process. Continual reassessment of the process allows for multiple routes to the Destination with full facilitative support by the faculty member. If any element of the course changes, it is possible that the change may impact the constructive alignment in the course. In those cases, the cyclic nature of the D4 framework may prove beneficial as constant reassessment is designed to identify incongruence.

Method

In fall 2014, a research study that was designed to assess the current objective writing knowledge and skill level of faculty took place at a large public university in the southeast United States. Faculty at this university are from a variety of backgrounds with various online academic experience. However, they are required to complete a faculty development course prior to designing and teaching an online

course. The university's award winning online faculty professional development program was created in 1996 to systematically teach faculty to design interactive online courses (Sorg and Darling, 2000). A portion of the course facilitates faculty through a learning experience that helps to teach them how to write quality learning objectives. Through the experience, faculty also learn the importance of writing quality objectives. Though additional faculty development programs are offered, once the course has been completed by the faculty member, they are not required to take any further online course design training throughout their time at the university.

Anecdotal evidence from instructional designers at the university suggests that faculty generally grasp writing quality learning objectives during their faculty development experience. However, faculty progression of objective writing seems to decline the further removed they are from the professional development course. A survey, referred to as the Measurable Learning Objectives Survey (MiLOS), was created and administered to faculty who had previously completed the required faculty development course and who are currently engaged in online course design and teaching. The MiLOs survey is divided into four sections that address: 1. Faculty use of objectives; 2. The point at which faculty use objectives in the course development process; 3. Instructor perception of the quality of their learning objectives; and 4. Instructor knowledge about quality learning objectives. Although anecdotal evidence suggested that faculty were struggling to progress in their objective writing skill, further probing was necessary to fully understand the problem and develop solutions to support faculty.

Research questions

1. To what extent are weekly/per module learning objectives and overall course learning objectives used by faculty members in the course development process?
2. At what point in the course development process do faculty members use learning objectives?
3. To what degree do instructors perceive to use quality learning objectives used in the course development process?
4. To what extent do instructors who report the use learning objectives in the course development process understand how to write quality learning objectives?

Key issues

As previously mentioned, the MiLOs survey was distributed in the fall of 2014 to faculty members at a large public research university in the southeast United States. The reliability and validity of the survey was tested by expert survey reviewers. Survey distribution took place via email with a link to the survey included in the email. The population was made up of university faculty members who had completed the university's training program for online and blended learning (N= 1252). Data was collected from a sample of those faculty members (n= 61) who responded to the survey. The feedback was anonymous. Eight of the university's colleges were represented as well as all levels of faculty promotional tracks.

Results

Research Question 1: To what extent are weekly/per module learning objectives and overall course learning objectives used by faculty members in the course development process?

The survey data indicated that 74% of the respondents (n=61) used overall course learning objectives as well as a more refined set of learning objectives for the weekly/per module content. A further 20%

of the respondents indicated that they used only broad overall course objectives, while 5% of the respondents only used weekly/per module learning objectives. Only 1.6% of the respondents used no learning objectives whatsoever to guide their courses.

At what point in the course development process do faculty members use learning objectives?

The MiLOS survey hid further questions when responders answered that they did not use learning objectives at all. Therefore, the following information represents only those respondents who indicated that they use any sort of learning objectives at any point during the course development process. Of the respondents who indicated that they use learning objectives, 91.8% (n=59) develop overall course objectives prior to planning a course. Almost 75% of respondents (n=58) indicated that they developed weekly/per module learning objectives before planning weekly module content. Of those who use objectives, 14.8% choose not to develop weekly learning objectives and opt to use only course objectives. Survey respondents who developed weekly objectives after the content was created was reported as 11.5%. Those statistics contrast greatly with the development of overall course objectives.

To what degree do instructors perceive to use quality learning objectives used in the course development process?

The following results discuss sections of the survey that addressed the instructor's' perception of their ability to build quality learning objectives. The survey results indicated that 54% of the respondents (n=57) at least considered learning domains in the development of their learning objectives. At the same time, 42.1% of respondents did not consider the learning domains when developing learning objectives to guide their courses.

63.9% of the respondents stated that they use verbs derived from Bloom's taxonomy within their objectives. The remainder of the respondents said that they either did not use Bloom's Taxonomy verbs (18%) or did not know what was meant by a Bloom's Taxonomy verb (13.1%).

When asked to rate the quality of their own learning objectives, only 19%of those surveyed (n=58) rated their learning objectives as a 5 on a scale from 1 to 5 with 5 being the highest rating. The majority of the respondents at 58.6% perceived the quality of their learning objectives to be a 4, while 17.2% and3.4% rated the quality of their objectives as a 3 or 2 respectively. None of the respondents perceived the quality of their learning objectives to be a 1 on the rating scale.

To what extent do instructors who report the use learning objectives in the course development process understand how to write quality learning objectives?

The survey included a free response section where respondents were asked to provide an example of a learning objective that they use in one of their fully online or blended courses. Figure 3 provides a breakdown of the free response data. The overwhelming majority (94%) of faculty members who answered the free response questions were missing at least one of the four criteria that make up a quality learning objectives. Only one respondent had all four criteria included within their objective example. When the data are scaled back to see the percentage of respondents who are only missing one piece of the criteria for a quality learning objective, an overwhelming majority (88%) still exists.

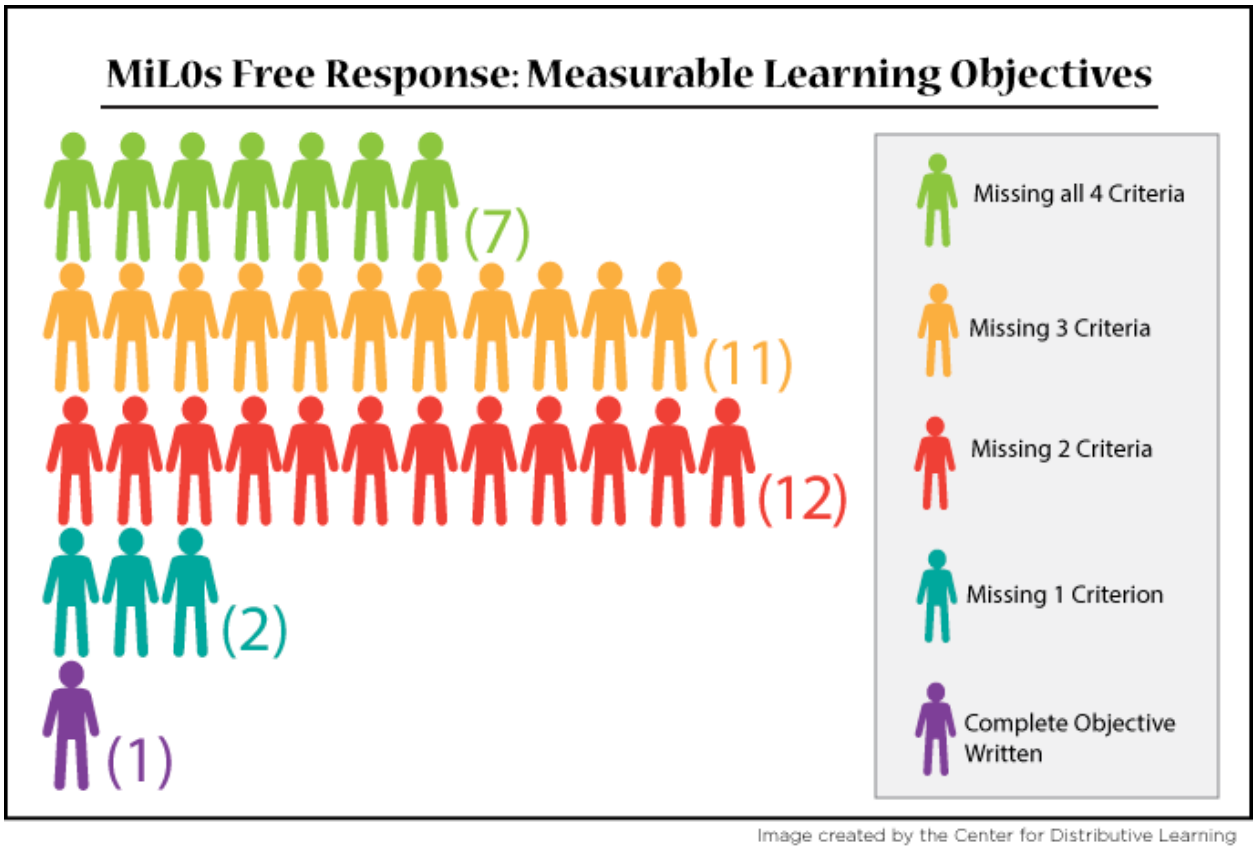

Figure 3. MiLOs Free Response Graph (n=34)

Discussion

- Faculty are creating objectives and to a degree deem objectives as an important piece of course development
- Faculty may be unsure about when, in the course development process, learning objectives should be used
- Faculty are unsure about the quality of their learning objectives and may be unsure about how to develop modules, content, and activities based upon their objectives

The survey results show that a high number of the respondents are indeed creating objectives. To at least some degree they view objectives as an important piece of the online course development process. Most of the respondent's desire to create, at a minimum, overall course goals that target student learning. However, almost a quarter of the respondents surveyed create module content with no specified learning targets identified via learning objectives for the module. This would indicate that although respondents believe that broad overarching objectives are important in overall course development, they do not believe that more specific learning objectives are as important in module development or may not feel they have the time to determine how to write good objectives.

Although it would seem on the surface that specific objectives may not appear to be weighed by respondent responses to be of significant value in online course development, further investigation of

the survey responses paints a different picture. Just over half (54%) consider learning domains (cognitive, affective, and psychomotor) when developing their objectives. Therefore, either learning domains are not as important to the respondents as they should be or the respondents may lack significant knowledge of learning domains. If the latter is true, then it is possible that the respondents may not realize that they should indeed be considering learning domains when they are not doing so. Since 31.8% of respondents did not use or perhaps understand Bloom's Taxonomy verbs, the same respondents may have difficulty understanding the value of using an actionable verb within a specific module objective as well.

Very few of the respondents surveyed believe that they currently write high quality objectives and most of them do see room for improvement. Survey questions concerning learning domains and Bloom's Taxonomy were used to obtain information about the respondents' knowledge about high quality learning objectives. Both indicators were low scoring. If just more than half of the respondents consider cognitive, affective, and psychomotor domains, yet do not implement the use of action verbs, the quality of the objectives may be at stake.

It may be speculative to only use the numerical data presented here to help determine that a percentage of respondents lack the knowledge to successfully develop and implement quality learning objectives. However, the free response section of the survey provides deeper insight into the possible existence of misunderstanding by respondents. As Figure 3 above outlines, many of the examples of objectives provided are considerably incomplete. When asked to provide an example objective that they used to develop a course, many respondents did not provide an example that included all elements of a quality learning objective: audience, performance, condition, and criterion.

Implications

Formulation of quality learning objectives continues to be an important component in the process of online course design. However, the process itself takes time that faculty members may not have. Furthermore, the terminology used to describe objectives can be confusing due to its interchangeable use in the literature (Kemp, Morrison, & Ross, 2003; Bostwick & Yokomoto, 1999). Despite these two factors, faculty view the importance of quality objectives as a foundation for effective online course design and relate the use of quality objectives to student success. Nonetheless, faculty perception of their ability to write quality objectives does not always correspond to what they actually produce. What may not be recognized by some faculty is the impact that quality objectives have on institutional constructive alignment. Moreover, a broad view of the importance of objectives to programmatic alignment may be misunderstood (Biggs, 2003; Biggs & Tang, 2011; Diamond, 2008). Consequently, results of the survey support proceeding with the reexamination of faculty development processes related to the creation of high quality learning objectives to aid course development.

In addition to the reexamination of faculty development processes, researchers considered that a quicker way to help faculty create quality objectives would be helpful. They decided to see if an effective online tool was readily available that would help faculty quickly and effectively create pedagogically sound learning objectives. It was decided to complete a thorough examination of several available objective building tools that would meet the following criteria:

1. Could faculty operate the product without technical assistance?
2. Could they operate the product at any time?
3. Does the product use a structured method (such as the ABCD method) to write objectives?
4. Does the product provide examples?
5. Does the product provide the opportunity to create objectives from multiple learning domains?
6. Can the product be integrated into a learning management system?

Although the tools examined had excellent features, none completely fulfilled the search criteria. After much internal discussion, a decision was made to custom build a completely online, free, learning objective-builder that was designed to meet current faculty needs.

A team comprised of an instructional designer and several Techrangers® (part-time student programmers) assembled to plan and develop a course objective-building tool based on the established criteria. Throughout the design and development process, feedback was solicited from instructional designers, assessment researchers, and faculty. The university's objective builder was built and officially released at the end of the fall 2014 semester.

Conclusion

Now that the tool has been available for use for an extended period of time, a new survey will be created and deployed in order to conduct future research studies designed to focus on the effectiveness of faculty using the objective builder tool. Specifically, does the tool help guide faculty in efficiently creating quality objectives that help align their courses during the development process? A link to the objective builder and information about how to use it has recently been added to the university's professional development course. Additionally, the impact of using the objective builder, if and how it will help to change the way faculty create learning objectives, and how faculty relate these updated objectives to institutional alignment is a topic in need of further study. The limited response rate could impact the reliability of the survey results. Future survey(s) will include additional incentives for participation that may increase the faculty response rate.

As both current and emerging technologies further integrate into the university landscape, and especially in the online course environment, the creation of quality objectives will increase in importance to ensure the instructional strategies and assessment methods are effective. Competency-based and adaptive learning programs are promising frontiers. However, both rely on less faculty interaction and more faculty facilitation as students progress through the content. Thus, clear learning objectives will play an increasingly important role in aligning the content and the assessments of competency-based and adaptive learning programs. As the transactional distance increases, online courses via emerging technological mediums will need to be extremely well-aligned to avoid student confusion. Accreditation of programs may hinge on the ability of program administrators to provide clear evidence related to what students are expected to learn as they progress through such programs. Well-designed online courses that include quality learning objectives will help provide that needed evidence.

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