

Learning On-Line: A Virtual Education?

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Abstract

Traditional and non-traditional colleges and universities are using a variety of instructional tools and techniques to deliver online courses to their students. A brief summary of off-site instructional delivery methodologies is provided to establish a historical framework for distance education. Several issues must be addressed before a comprehensive on-line program can be implemented. Once a specified delivery method is selected, other equally important issues come into focus. The first area of concern is to insure that academic integrity and honesty issues are addressed for each student. The learning objectives for the course material must be clearly defined and evaluated. The course content must be developed, delivered, and evaluated in a timely manner, and high quality standards must be apparent throughout all segments of the course.

Learning effectiveness and transfer of training issues must be addressed in a forum where the instructor cannot personally interact with his/her students. For many students, the level of student/faculty interaction is a critical factor in determining the success or failure of a course and ultimately for the entire academic program. Interaction can be as extensive and costly as two-way, synchronous video conferencing, or as simple as using e-mail to conduct an asynchronous dialogue with students. This paper presents a critical evaluation of online developmental issues in the context of current distance delivery methodologies.

Background

Online instruction is becoming an essential component of many academic programs, largely as a result of the World Wide Web and the proliferation of personal computers in offices and homes throughout the world. Information is readily available through online search engines, but information in itself is merely a small component of the overall educational process. A person must go through several stages of information gathering, integration, and analysis before their knowledge base can be reinforced and enhanced. It must be recognized that the ability to quickly locate information is indeed a powerful tool in meeting educational objectives. However, the essential conditions that must be monitored, are the ways in which this readily available body of information, can be packaged, delivered, and utilized in such a way as to enhance a person's individual skill set. Skills, Knowledge, and Abilities (SKA) are terms used in the literature to help categorize and define various dimensions of a person's educational and professional composition (UCLA, 2001; OPM, 2000). Skills are developed over time as a result of individual experiences and through practical application of tasks that a person performs. An

individual oftentimes develops these skills with the help of a mentor or a coach. Skills are defined to include manual dexterity, practical abilities, and aptitude. Knowledge is the educational foundation established over an individual's lifetime. It is the result of integrating a variety of data elements into a cohesive package of information that can be used to make practical, logical and relevant decisions about the world around us. One's ability includes an individual's propensity to act upon a specified set of conditions in order to achieve some desired outcome. Using the term "Ability" in this context includes an individual's motivation to complete an assigned task and the commitment to meet specified deadlines, whether they be self-imposed or as the result of an instructor's assignment. These terms will become very important later in the paper. SKAs are typically used to develop job descriptions and to define the requisite skill sets that a worker must have in order to be qualified for the position.

A skill, knowledge or ability is something a worker knows or can do that enables the worker to successfully perform the duties of the job. Basic SKA categories include but are not limited to the following: Vocational (work content skills), Language Skills (reading, writing, and speaking), Mathematical Skills, Human Relations, Reasoning, Self Management. (UCLA, 2001)

Sets of job elements (skills, knowledge, abilities, and personal characteristics considered necessary for success on the job) are approved by the U.S. Office of Personnel Management for individual occupations as well as for jobs having common requirements. Jobs with common requirements such as apprentices and high-level supervisors are shown in the Examining Guides. (OPM, 2000)

In order to enhance the SKA's of an individual, several methodologies are available. Traditional methods of *passing the torch* from one generation to the next have historically centered on individual tutoring, small group mentoring, and "on-the-job" training. This individualized instruction has been relatively successful in establishing craftsmen (and craftswomen) within our society, but the ability to reach a large segment of the population, using this one-on-one technique is severely limited. One person can only mentor so many individuals during a single lifetime. With the advent of information-based delivery systems and high-speed computer connectivity, the task of educating the population evolves into one of providing the right mix of information, at the right time, and *in the proper portions*, so an individual can assimilate the new information into their own SKA set, thus enhancing their educational foundation. Under this new metric, *information management* now becomes a driving factor in building a robust educational delivery system. Information management tools and techniques must be used in concert with educational delivery standards that have proven successful in more traditional educational/classroom settings.

Distance Education Delivery Methodologies – Historical Context

One of the original distance education methodologies was to provide the student with instructional materials by means of written correspondence, without the aid of electronic equipment. This method allowed the instructor to provide specific lessons to the student and was generally based on the assumption that the written material alone would convey the complete, unambiguous information set intended by the instructor. This instructional methodology may

have also included an instructional workbook or programmed text. Anyone who has completed a traditional correspondence course has experienced this form of instructional delivery. A follow-on method of instructional delivery incorporated a cassette tape (*or other recorded media*) that provided the student with voice-over dialogue oftentimes augmented with textbooks and/or workbooks to help the student “participate” in the learning experience. The cassette tape or voice-only method was later augmented with synchronized audio and photographic slide show presentations (typically using 35 millimeter slides). A severe limitation to this type of distance education delivery model was the costs required to produce, distribute, maintain, and update the curriculum materials. Another limiting factor was the cost to purchase the necessary equipment to deploy this instructional technology, which generally made this option cost prohibitive for most individual students. This technology was, however, oftentimes used in classroom environments in universities, high schools, middle schools/junior high schools, elementary schools, industrial settings, and in the military.

The next technological “revolution” came in the form of cost-effective videotape equipment and supporting media. Videotaped instructional programs soon followed as the technology became more affordable, thus allowing the majority of “students” to have access to players in their homes or at their places of business. Videotaped instructional programs provided visual and aural reinforcement, making the learning experience more personal (at least in the eyes of the student). New media and equipment have continued to evolve, through computer-based training software, CD-ROM, DVD-ROM, and now, mini-DVD and mini-CD-ROM media are being integrated into the educational system. Each of these instructional delivery techniques have certain advantages and disadvantages that go beyond the scope of this paper, however, most have been used effectively in one or more applications.

Information Resources

With the advent of the personal computer, the World Wide Web, the Internet, and the corresponding explosion in the number of web pages developed to place information onto the web, a fundamental shift has occurred in the way students seek out new information and then use this information to enhance their educational program. Traditional information reserves, including libraries, are utilized less today in many sectors than they were just ten years ago.

Among respondents who reported using both the library and the internet, the average percentage of respondents who reported using only the internet (20.3%) for some reasons was twice as large as the average percentage of respondents who reported using only the library (9.7%) for some reasons. This indicates that where users are using only one or the other of the two providers, the internet is being used by about twice as many users. (D’Elia and Rodger, October 2000)

In order for libraries to remain active in the information collection and dissemination process, they too have had to change their way of thinking about access to information and customer support. This change includes desktop delivery of digitized references. As a result, many (*if not most*) libraries have established web-based information portals to provide immediate access to information contained within their archives.

As new information becomes available, consortiums and cross-disciplinary agreements are being negotiated between many information warehouses to provide broad access to published materials in near real time. Customers are becoming accustomed to any time–any place access to relevant information, and are therefore forcing information providers, *including faculty at institutions of higher education*, to become more flexible with respect to the times, places, and methods in which this information is made available. There is concern among many in higher education that the traditional “brick and mortar” facilities that define well-established universities today may become an obsolete artifact of the educational system within the next ten to twenty years. These concerns aside, the issue of providing appropriate, relevant, timely, accurate, and high quality educational products to current and future students remains a prime objective of the academy. The technologies and techniques available to provide this level of service will evolve, as shown above, but the objective of getting the highest level of understanding and performance from our students remains constant.

Motivation

A factor that is equally important to the technologies used in educational systems and to the techniques used to manage vast amounts of information is the individual motivation to participate and to learn that a person brings to the educational setting. A high degree of individual motivation is necessary for a person to take full advantage of any educational system paradigm. The Britannica.com web site (2001) defines motivation as “forces acting either on or within a person to initiate behaviour. The word is derived from the Latin term *motivus* (‘a moving cause’), which suggests the activating properties of the processes involved in psychological motivation.” Assuming that the person is motivated to participate in the educational process, there are basically two extremes to the individual motivation continuum. These are *Intrinsic* and *Extrinsic*. The type of motivation that is needed for success in a given environment varies from one individual to the next. For example, one who gains information and knowledge through one-on-one contact with a personal mentor, can often succeed with extrinsic motivation, whereas, an individual who does not have personal contact with the mentor or instructor, extrinsic motivational factors are less important, leading to a much higher reliance on intrinsic motivational factors. In their introduction to distance education courses, Western Governors University (WGU) identifies the need for students to be self-motivated and self-disciplined at the very beginning of their enrollment process at WGU.

The courses and programs offered through WGU are delivered to students through various distance learning methods. Those methods include some high-tech approaches (such as desktop video) and traditional approaches (such as postal correspondence). Regardless of the delivery method employed, successful distance learning students are self-motivated and self-disciplined. Some people new to distance education mistakenly believe that distance-delivered courses will be “easier” than courses offered in traditional, on-campus formats. That is certainly not the case. (Western Governors University, 2001)

In order to aid the student in identifying the proper instructional delivery model to address their individual learning style, WGU also provides a short evaluation survey that can be completed

online, before a student commits to a costly field of study that is not well suited to their individual learning style.

To help potential WGU students determine whether distance education will fit with their own needs and learning style, WGU has developed a short online survey. Students who do not have Internet access may call the WGU Student Services Center and complete the survey over the phone. (Western Governors University, 2001)

Student motivation is clearly a prerequisite to successful completion of a program of study delivered via distance education, but the two widely recognized forms of motivation, *Extrinsic* and *Intrinsic* must be defined and used consistently as educators prepare to meet the needs of students that they may never meet in person. The definitions of individual motivation, summarized by Huitt (2001), help create an understanding of the roles each participant must play in a successful distance education model.

The following definitions of motivation were gleaned from a variety of psychology textbooks and reflect the general consensus that motivation is an internal state or condition (sometimes described as a need, desire, or want) that serves to activate or energize behavior and give it direction (see Kleinginna and Kleinginna, 1981a).

- internal state or condition that activates behavior and gives it direction;
- desire or want that energizes and directs goal-oriented behavior;
- influence of needs and desires on the intensity and direction of behavior.

Franken (1994) provides an additional component in his definition:

- the arousal, direction, and persistence of behavior.

While still not widespread in terms of introductory psychology textbooks, many researchers are now beginning to acknowledge that the factors that energize behavior are likely different from the factors that provide for its persistence. (Huitt, 2001)

Assessing student motivational preference is an important, yet largely unused technique, in advising and enrolling students in distance education curriculum. It is assumed that the student will successfully complete the course requirements regardless of their individual motivational style. Motivational assessment tools need to be developed and used to help students determine their individual learning styles. This added level of assessment and evaluation would be useful in guiding the student into the proper method of instructional delivery for their individual background. Successful distance education students must be: 1) able to organize and plan their time well, 2) comfortable working independently, and 3) competent in using current technologies.

Beyond the definition of individual student motivation, however, the faculty member and the student alike must acknowledge and ascribe to a fundamental understanding of other issues surrounding the distance education domain. Appropriate rules and protections (*for both the*

faculty member and the student) must be defined in advance. If these established procedures are violated, there needs to be a means to enforce the rules. As part of the distance education curriculum design process, several issues must be considered. Some examples of these supplementary issues include:

- *Personal integrity:* How does the instructor know that the person completing the assignments is actually the person who has enrolled in the course?
- *Academic integrity:* How is academic quality and content integrity to be maintained?
- *Evaluation Criterion:* How does the instructor evaluate the student's course materials? The tendency in distance education is to create a one-dimensional evaluation of student work.
- *Learning Styles:* How does the distance education system address the need to accommodate the different student learning styles, including: Aural, Tactile, and/or Visual?
- *Sensory Stimuli:* Does the distance education environment provide stand-alone, independent sensory stimulus for the student learner or does it accommodate multiple, concurrent stimuli?
- *Education or Training:* Are the differences between education and training clearly understood and integrated into the learning models?
- *Team Development:* How are students able to develop team-oriented skills when they are unable to meet other students except in a virtual environment? How are cohorts, group processes, collaboration, and team projects completed?
- *Assessment:* Is the student expected to achieve a competency-based or proficiency-based education? How will the student be assessed with respect to on-site students? Is an online education the same as, better than, or worse than one a student receives from a "brick-and-mortar" institution? How does the student attain the necessary Skills, Knowledge, and Abilities?

Quality versus Quantity

Other important questions must also be addressed during the online curriculum development process. After the online system is “up and running”, it becomes much more difficult to implement changes for students who are currently enrolled in the system. For example, the development must consider what educational elements can be (*or should be*) integrated into the online experience. How should laboratory experiences be handled, or do we limit the types of courses available online to a subset of those required in a given discipline? Can an online degree program satisfy the standardization and performance requirements established by governmental agencies, professional organizations, and accrediting bodies? In what ways are educational experiences of a student affected by distance education? When and how will the instructor and the student establish a one-on-one relationship, or is it necessary that such a personal investment be made in the educational process? What limitations exist when the instructor and the student never see, hear, or touch one another as they are able to do in a traditional classroom setting? How does personal (*or face-to-face*) interaction affect the learning process? What other educational and professional development functions are served through classroom-style interactions that are difficult, if not impossible to accomplish online?

An example of courses that would be problematic for online delivery might include: swimming, ballroom dancing, aircraft engine maintenance and overhaul, chemical laboratories, high-altitude physiology, and surgical laboratories. It is not to say that students could not be exposed to the theory and some limited application within each of these topics through use of sophisticated computer simulation models. It is unlikely, however, that anyone would volunteer to “go under the knife” of a surgeon, who performed the surgical procedure only in a virtual or simulated environment. Within the context of distance delivery methodologies, issues of student motivation and ultimately the quality of their educational experience must remain in the forefront of curriculum development and assessment. In the next section, the motivational continuum will be integrated into a conceptual model of student performance within virtual education systems, following a short introduction to Place–Time relationships as cited by Graves (2001).

Place–Time Continuum

Graves (2001) places two critical components into a two-dimensional educational delivery continuum, called the Place–Time Continuum (see Figure 1.) The value of looking at the educational delivery system in terms of Place and Time allows the various user groups or stakeholders to participate in a meaningful dialogue regarding the needs and expectations of each stakeholder. Users such as students, faculty, administrators, and information technologists, must develop a consensus solution to educational delivery, if the students (or customers in this case) are to participate in the educational process as defined by a given institution. The advent of “Any Time–Any Place” educational programs creates another level of complexity when issues such as academic excellence, rigor, thoroughness, and quality are concerned. Learning objectives and outcomes assessment metrics are now being emphasized to address some of the quality and standardization issues in higher education, but the issue of course equivalence and transferability between institutions remains a problem.

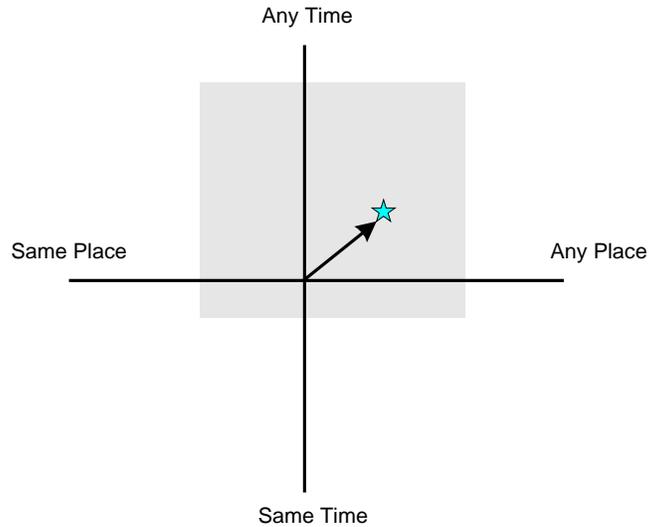


Figure 1. The Place–Time (Graves, 2001)

As shown in Figure 2, Graves (2001) depicts an additional axis to describe the sourcing continuum for educational operations. Two terms, *In sourcing* and *Out sourcing*, are used by the author to describe this third continuum. *In sourcing* is defined as the delivery of educational content using organization-owned, maintained, and upgraded equipment, software, and courseware systems. *Out sourcing* is used to describe the level of outside agencies or businesses needed to deliver the educational products from the institution to the customer (student). This three-dimensional perspective helps decision makers consider cost effective alternatives for expanding into new delivery domains (e.g. distance education). It can also be used to help them decide that the new delivery domain is beyond the scope of an institution’s capabilities and is therefore not considered to be a feasible alternative for servicing those customers (students) who desire or demand an enhanced level of course flexibility and availability.

Student motivation naturally has to do with students' desire to participate in the learning process. But it also concerns the reasons or goals that underlie their involvement or noninvolvement in academic activities. Although students may be equally motivated to perform a task, the sources of their motivation may differ.

A student who is **INTRINSICALLY** motivated undertakes an activity "for its own sake, for the enjoyment it provides, the learning it permits, or the feelings of accomplishment it evokes" (Mark Lepper 1988). An **EXTRINSICALLY** motivated student performs "IN ORDER TO obtain some reward or avoid some punishment external to the activity itself," such as grades, stickers, or teacher approval (Lepper).

The term **MOTIVATION TO LEARN** has a slightly different meaning. It is defined by one author as "the meaningfulness, value, and benefits of academic tasks to the learner--regardless of whether or not they are intrinsically interesting" (Hermine Marshall 1987). Another notes that motivation to learn is characterized

by long-term, quality involvement in learning and commitment to the process of learning (Carole Ames 1990). KidSource OnLine (2000)

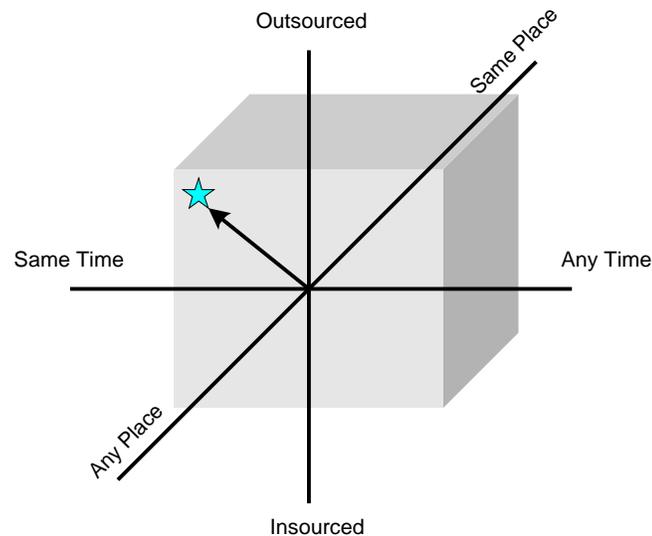


Figure 2. The Place–Time–Operations Continuum (Graves, 2001)

Intrinsic–Extrinsic Motivation Continuum

By using the *Intrinsic–Extrinsic* continuum cited above, as a *required component* for individual success within the educational system, a three-dimensional diagram can be developed, using the two-dimensional Place–Time Continuum (see Figure 1). By integrating the motivational spectrum with the Place–Time axes (see Figure 3), a new picture emerges to help guide faculty and instructional systems designers in understanding how, and to some degree why, some students do extremely well in virtual educational settings while others perform very poorly. By using a 0 to 10 scale to depict the relative position along each axis, we can discuss the roles and relationships that one educational setting/student combination has with respect to another educational setting/student combination. For example, the two stars inside the sphere (numbered 1 and 2) can be plotted using values of x , y , & z as follows. As depicted in Figure 4, Star number 1 in the upper left-hand position, can be depicted by the values of $x = 3$, $y = 6$, and $z = 5$ while Star number 2 in the lower right-hand position, can be described by values for x , y , & z as $x = 6$, $y = 1$, and $z = 4$ respectively. To demonstrate what the central values would indicate [$x = 5$, $y = 5$, $z = 5$], a student with these scores would likely be equally comfortable with on-site or off-site delivery models and would work equally well in both synchronous (same time) and asynchronous (any time). In other words, this student would be able to bring the correct mix of *Intrinsic* and *Extrinsic* motivation “to the table” to allow him/her to benefit from “Same Place–Same Time” and “Any Place–Any Time” delivery models, with predictably equal success. For a student who placed high on the extrinsic motivation scale ($z = 0, 1, 2$ or 3), they would likely be much more successful in “Same Place–Same Time” delivery models.

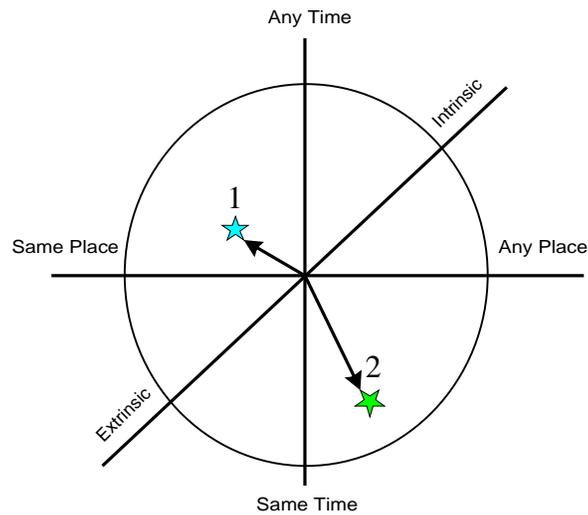


Figure 3. The Place–Time–Motivation Continuum (Jackson & Jackson, 2002)

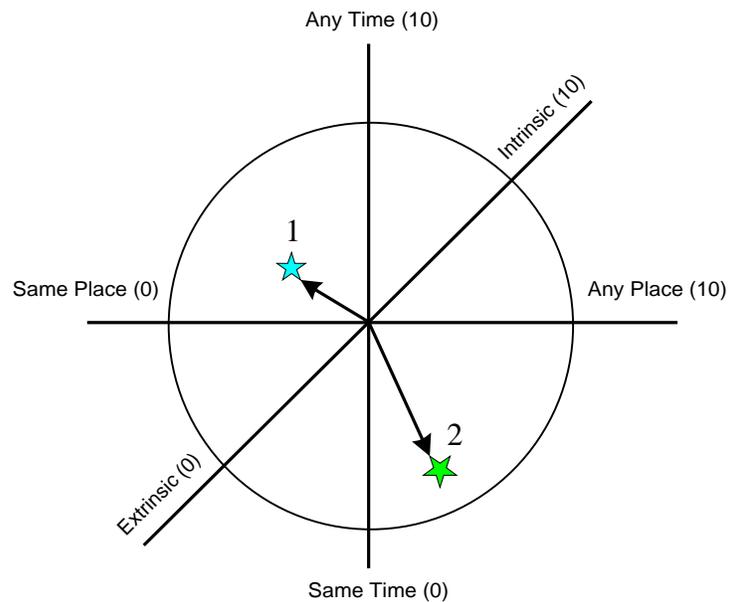


Figure 4. The Place–Time–Motivation Continuum with Scale Values (Jackson & Jackson, 2002)

Existing personality evaluation and/or assessment tools could be used on the *Intrinsic–Extrinsic* continuum for this three-dimensional model. Scores obtained from most (*if not all*) assessment tools could be placed into an equivalent (or scaled, 0 to 10) system to fit into the Place–Time–Motivation Continuum model. One such assessment model is related to a person’s internal versus external Locus of Control as described by Seamon and Kenrick (1994). Using

this particular assessment tool, a 0 to 7 point score is possible, and a simple translation can be established to fit onto the *Intrinsic–Extrinsic* continuum scale. For the time axis, a simple percentage assessment can be used to define the scale. For the place axis, some consensus would need to be developed with respect to an appropriate scale. It should be noted that distance alone is not a perfect metric for the *Place* scale. For example, a person sitting in the very last row of a 1,500-seat auditorium may warrant a lower score on the *Place* scale, compared to another student who is participating in *the exact same course at the exact same time*, but as a result of the course being transmitted across the United States using two-way telecommunications and video conferencing, a one-on-one interface with the instructor is easily created. In this instance, the involvement and engagement between the different sets of educational participants will likely result in the “distant student” receiving a lower score on the *Place* scale than the “disengaged local student.” The issue of *Place* should be standardized over time and placed into an agreed-upon matrix of values for future applications. Since the *Place–Time–Motivation Continuum* model is still in a conceptual development stage, these structural/application issues still require further analysis.

Summary

The authors have provided an overview of the distance education process, based on a historical overview of technologies used to deliver distance education to the customer. Furthermore, they have highlighted several online development and design issues that must be addressed before an effective program can be implemented. A number of questions have been posed to guide development teams through the maze of issues they face. Individual student motivation has been covered as it affects the potential success or failure of students who engage in online educational opportunities. The *Intrinsic–Extrinsic* motivational continuum was addressed in the context of a new model, based on Graves (2001) distance education delivery model. The new conceptual model can be used to integrate a number of existing evaluation tools to help the student better understand their potential for success in a distance education environment, based on their individual motivation construct. The *Place–Time–Motivation Continuum Model* presented herein can also serve as a tool to assist the faculty member or academic advisor in guiding students through the available educational delivery options.

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