Individualizing Experiential Learning: A Theoretical Perspective

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ABSTRACT

Experiential learning is inherently individual in nature, ultimately taking place in the minds of individual students. However, most experiential learning research focuses on applications in group situations. This focus on group settings makes sense when the educational objectives address group dynamics, where student interactions provide the data from which the students learn experientially. Even when student interactions do not provide data, group experiential learning designs tend to be driven by the exigencies of tight educational budgets and economies of scale provided by group versus individual instruction. Drawing on Christensen's (Christensen, 2005; Christensen, Horn, & Johnson, 2011) theory of disruptive innovations, this paper discusses how experiential education might be individualized within a set of constrained resources.

INTRODUCTION

In the keynote address to the 2019 Conference of the Association for Business Simulation (ABSEL), Bob Daugherty, Executive Dean of the Forbes School of Business and Technology at Ashford University, summarized several significant changes taking place in the global marketplace for business education (B. Dougherty, personal communication, 2019, March 21). Reflected in these changes is a shift in the locus of educational responsibility from the instructor to the student. Changes along these lines have received considerable attention among ABSEL researchers and business educators in general. Indeed, the general premise of experiential learning is that students learn through a process of reflecting on their experience, forming abstract concepts and generalizations, and testing the implications of these concepts (Kolb 1984). As Kolb noted, learning is "the process whereby knowledge is created through the transformation of experience" (1984, p. 41). Experience is an inherently individual event that takes place in the minds of an individual, not the teacher.

Several studies in the ABSEL literature have addressed this shift from a teaching to a learning focus using Vargo and Lusch's (2004) concept of service-dominant logic (SDL) from Marketing. The premise of SDL is that marketers err by focusing on need-meeting products and services. From an SDL perspective, products and services are simply resources that enable consumers, through interactions with consumers' own resources, to co-create satisfying experiences. The products and services provide "operant" resources that activate consumers' "operand" resources to begin the co-creative process. Applying this to education, the enabling operant resources are the educational experiences – the educational materials, guidance, and motivational interventions – that help stimulate the learning process, while the operand resources are the students' prior knowledge and skills, their styles of thinking and learning styles, and the wants/needs that drive their motivation.

Taking the SDL approach, Geddes, Cannon, Cannon and Feinstein (2015) build on the notion that learning, and particularly experiential learning, is a process that ultimately takes place inside the learner. Their argument addresses the role of SDL in the development of individual absorptive capacity (Cannon, Geddes & Feinstein, 2014), managing live-case competitions (Geddes, Lee, Wilson, Harris & Cannon, 2016), teaching values (Cannon, Cannon, Geddes & Feinstein, 2016), the design of individual versus group experiential designs (Geddes, Cannon & Cannon, 2017), increasing the cost-effectiveness of business curricula (Geddes,

Cannon & Cannon, 2018), and structuring internship programs (Cannon & Geddes, 2019). In similar fashion, Kurthakoti (2019) applies SDL in his analysis of a flipped classroom.

In addition to the scholarship advanced through ABSEL, Chalcraft and Lynch (2011) and Dziewanowska (2017) address SDL's value proposition by investigating how educational institutions and students interact with each other. Ford and Bowen (2008) argue for the timeliness in considering SDL ideals in the management curriculum. Moerkerke (2015) looks at the open university model in which students become co-creators of value. Lusch and Wu (2012) also address co-creation of value through application of SDL, recommending an architecture of participation among key stakeholders in higher education. In sum, the literature concludes that value co-creation enabled by the SDL approach can improve learning effectiveness in higher education (Jarvis, Halvorson, Sadeque, & Johnston, 2014; Nguyen, Shirahada, & Kosaka, 2012; Zulkefli & Uden, 2013).

The SDL framework provides a powerful argument for a more student-centered approach to education. The educational experience – the student's co-creation of knowledge within the context of a classroom or other educational settings – is clearly unique to each student. Presumably, the nature of the operant resources provided by educational settings would be unique to the individual as well. However, budgetary constraints tend to militate against this type of individualized instruction. A major driver of today's typical classroom environment is the need for economies of scale (Christensen, Horn, & Johnson, 2011). Given universities' inability to address each student individually, they tend to focus on (standardized) quality curriculum, teaching effectiveness, and student selectivity as a means of ensuring educational quality for the group as a whole (Simpson, 1979; Sleeter & Carmona, 2017). Student achievement is still the critical measure of success. However, the focus is on average achievement rather than the degree to which individuals achieve their learning objectives and the fulfillment of their educational potential. In contrast, students' achievement of their individual learning objectives and fulfillment of their educational potential are criteria that serve an educational process governed by SDL and the broader educational objectives of society. Those interests of society must include creating opportunities for everyone, not just the most educationally talented, or more correctly stated, the portion of society whose educational talents best prepare them for the mass-market approaches that currently dominate our educational institutions.

Clayton Christensen and his colleagues address the individualization problem using Christensen's theory of "disruptive" and "sustaining innovations" (Bower & Christensen, 1995; Christensen, 1997, 2006; Christensen et al., 2011; Christensen & Overdorf, 2000; Christensen & Raynor, 2013). According to his theory, innovations that have the potential to disrupt existing markets are initially relatively expensive and often limited in their functionality, thus narrowing their appeal to small segments of the market whose needs are not well served by mainstream products. As a result, established marketers neglect them in favor of innovations that improve, and hence, sustain the viability of their more profitable mass-market products. However, as the technologies driving disruptive to innovations improve, they become relatively less expensive, their functionality improves, and their appeal increases. Their potential for disruption comes from the fact that being early in the product life cycles, there is greater room for improvements than is the case with more mature, sustaining technologies.

Applying this to education, Christensen and his colleagues argue that the advent of computer- and internet-based technologies are doing much of the work that used to rest with teachers in a much more individualized way. The disruptive potential of these technologies is still accelerating, whereas the incremental value of human-based technologies continues to fall. This paper will draw on Christensen's theory to suggest an approach through which business schools might economically address the need for more individualized education.

THEORY DEVELOPMENT

As we have suggested in our introduction, Christensen's theory suggests that established institutions (such as traditional universities, and in our case, business schools) tend to succeed through a process of "sustaining" innovation. That is, they continually strive to get better at what they do, delivering ever more value per dollar spent on their customers. This tends to be through continual improvements in the curriculum, hiring the most knowledgeable and engaging faculty, and searching for ever more effective ways of attracting students who will be effective in both their academic performance and their ability to secure and succeed in the most prestigious and lucrative jobs upon graduation.

In service of these objectives, the schools continually seek to update their curriculum based on the latest developments in business theory and practice. They deliver the curriculum most flexibly and effectively as possible, incorporating such things as distance learning technologies, computer-support, incorporation of multimedia classroom support, and innovative teaching methodologies (e.g. flipped classrooms and experiential learning designs). Such schools encourage their faculty to stay on the cutting edge of relevant developments in their field, requiring ever-increasing levels of research productivity, engagement with the business community, and practical innovations in teaching methodology. Schools provide an ever-increasing level of support for graduates, publicizing their achievements, providing internship and placement services, and generally courting the participation and support of the business community in school activities.

Contrast these activities with the kind of individualized support called for by the SDL approach. The premise of SDL is that every student comes to the school with a different set of needs, goals, and abilities. The school provides operant resources that activate the student's operand resources to create an educational process. In other words, the role of the school is to facilitate the creation of education rather than providing the education itself. As Geddes et al. (2017) point out in their discussion of co-creative educational strategies, the educational process proceeds as an on-going interaction between operant and operand resources, ultimately provided by both the teacher and the student. Given the inherent limitations in the teacher's knowledge and the fact that

each student brings a different set of needs, goals, and resources to the learning process, the ideal teacher facilitates co-creation of an educational environment rather than providing knowledge resources. Thus, the key attributes of an effective teacher would be the ability to quickly recognize the types of resources a particular student both has (operand) and needs (operant), and to assist the student in utilizing them in the educational process (Bovill, Cook-Sather, Felten, Millard, & Moore-Cherry, 2016; Goodyear & Dudley, 2015; Li-fang, 2018; Long, 2018).

Casting the role of the teacher as a learning facilitator rather than a source of knowledge reflects what Christensen characterizes as a disruptive innovation. As we have noted above, established institutions tend to become very efficient and effective in utilizing sustaining innovations to support their established market position. In the case of business schools, disruptive innovations arise to meet the needs of students who are underserved by the broader sustaining- approach of treating all students alike, only with greater efficiency. For instance, disruptive innovations would include innovative programs targeted to students who have the personal motivation, interests, and skills necessary to pursue independent study or other individualized curricula under the tutelage of personal mentors. While independent studies and individualized programs can be highly effective, only a small proportion of the student population typically possesses the motivation and skills necessary to pursue them effectively. At the same time, they tend to demand a great deal of professorial time and other resources, thus making them expensive to administer (Miller, 2016). A sustaining innovation would be to increase class sizes to increase the efficiency of knowledge delivery, supplementing them with less the expensive tutorial or laboratory sessions led by grad students or peer tutors to help motivate students and fill in the gaps in understanding of the lecture material.

One of the characteristics of successful disruptive innovations is that the technologies they incorporate are themselves supported by sustaining patterns of innovation that eventually enable them to compete with and often displace, the original technologies that rendered them uncompetitive in the mainstream markets (Christensen et al., 2011). In the case of education, a modern computer and telecommunication technology, combined with search tools such as Google and open-source information services such as Wikipedia, make information quickly accessible and in highly readable form to virtually anyone with Internet access. For students who have trouble reading or are naturally slow readers, information is readily available in audio form through natural text readers and pre-recorded sources. With the assistance of a readily available computer or cell-phone app, these sources can then be played at different speeds. The same is true for video sources, such as YouTube.com. To address problems of motivation and experiential impact, these tools can be embedded in games and experiential exercises, along with simulated problem situations and live in-place or computer-assisted student interaction.

The first stage of Christensen's theory posits companies employing what Porter (1985, 2008) characterized as a "differentiation" strategy. That is, a company seeks to sustain a market advantage by developing and continually improving its products and services. By contrast, disruptive innovations might begin with cheaper, lower-quality products and services, initially aimed at a different, less demanding market, or perhaps, a more demanding market requiring more expensive, specialized products. Steering an organization's innovative efforts toward "disruption" would be typical of what Porter characterized as a "focus" strategy. The key difference in Christensen's theory is the dynamic nature of disruptive innovations. While the disrupting companies begin with products that are not attractive to companies competing in the mainstream market, they typically begin their programs of sustaining innovations in order to increase their attractiveness to the customers they serve. In the process, they often become gradually more attractive to customers in the mainstream market that initially eschewed their products because of their inferior quality or excessive price.

Schmidt and Druehl (2008) illustrate the disruptive process in their analysis of computer disk drives and their diffusion across five markets – mainframe computers, midrange computers, desktop computers, laptop computers, and specialty computer devices (e.g. PDA's, MP3s, smart phones, and similar innovations). The diffusion is reflected in the degree to which the disk-drives (and drive-related storage devices) developed for one market encroached upon another. In the next section, we will show how this parallels patterns we have observed in the market for higher education.

In the beginning, disk drives were developed for the mainframe market (Schmidt & Druehl, 2008). The focal attribute was storage capacity. Size was not a significant consideration, and the market was relatively insensitive to price. Storage capacity became an important factor, although to a lesser degree, in the midrange computer market as well. As the market for desktop and laptop computers developed, this also created a need for disk-type storage. However, price and size were the key attributes, rather than storage capacity. The growing off-line storage for desktop and laptop computers created some sales opportunities for high-end disk drives. Schmidt and Druehl called this "high-end encroachment" (p. 356). Disk drive manufacturers introduced sustaining innovations into the market. These new product offerings included denser and more economical storage. However, the low-end markets did not offer enough market potential to draw existing manufacturers into developing products that were specifically designed for their needs.

In the absence of targeted efforts by high-end drive manufacturers to develop products specifically designed to meet the needs of desktop and laptop computer users, new companies were formed to address these needs. In future iterations, the needs included those of specialty markets as well, where the demands for small size and low price were even more stringent. As the low-end technology developed, capacity increased dramatically, thus opening the door for sales of low-end drives to traditional high-end drive users (another example of what Schmidt and Druehl, 2008, call "low-end encroachment", p. 357), an example of disruptive innovation.

APPLYING THE THEORY TO THE EDUCATIONAL MARKET

For purposes of discussion, imagine the disk drive market as a metaphor for business school programs. The educational analog to the mainframe, midrange, desktop, laptop, and specialty computer devices might be research universities, midrange teaching and research universities, teaching universities, community colleges, and specialty programs (the host of radically innovative schools designed to meet the needs of underserved students without the traditional consideration for formal accreditation). These are roughly portrayed in Table 1.

TABLE 1:
Illustrative Classification of Educational Markets

	Elite Universities	Midrange Universities	Teaching Universities	Community Colleges	Specialty Schools
Targeting Strategy	Highly selective	Moderately selective	Relatively unselective	Open enrollment	Varied
Educational Product	Faculty composed of elite scholars	Faculty composed of research-active scholars	Faculty composed of academically qualified teachers	Faculty selected by demonstrated teaching effectiveness	Various approaches selected to produce measurable

Following the patterns discussed by Schmidt and Druehl (2008), we see evidence of both high- and low-end encroachment in education. As the market has expanded for sophisticated business schools, we have seen dramatic growth in the number and quality of doctoral programs seeking to prepare the scholars needed to fill a growing number of faculty positions (Nerad, 2010). The demand for faculty at the most elite universities tends to be relatively price-insensitive with an emphasis on intellectual stature and research productivity (Altbach, 2015; Finch, Deephouse, O'Reilly, Massie, & Hillenbrand, 2016). We see high-end encroachment in that teaching universities, and even community colleges are now increasing the rate of hiring doctoral qualified faculty. This action on the part of administration addresses the rapidly expanding body of professional knowledge students will need to master in order to succeed in today's world of business (Viola & Glantsman, 2017, p. 202).

The patterns of low-end encroachment are more subtle, but no less prevalent. As of 2018, the cost of today's higher education is growing eight times faster than the growth of wages (Maldonado, 2018), creating a funding crisis for sponsoring governments, other funding institutions, and for self-funding students who are graduating with increasing levels of student debt (Friedman, 2019). To cut costs, we see low-end encroachment as schools have supplemented doctoral faculty with less expensive part-time faculty and non-tenure-track lecturers (Barnshaw & Dunietz, 2015; Hurlburt & McGarrah; 2017; Maxey & Kezar, 2015). To mitigate the knowledge gap between doctoral professors and lecturers, publishers have developed ever-more sophisticated texts and supplementary materials that help provide students convenient access to the latest knowledge in their fields of study.

Consistent with Schmidt and Druehl's (2008) interpretation of Christensen's theory of innovations, the process of disruptive innovation is growing out of this low-end encroachment. Beyond the efforts of textbook publishers, we are witnessing a virtual explosion of low-cost and free educational materials becoming available to teachers and students (Ally & Samaka, 2013; Horn, 2015). The low-cost to no-cost resource availability extends across general Internet information systems (e.g. Google and Wikipedia), multi-media delivery services, online courses, and more general sources, such as podcasts and YouTube videos.

A NEW MODEL

Note that the structure of the first four markets portrayed in Table 1 vary only in the type of resources they employ and the types of students they seek to serve. The implicit assumption in the structure of conventional programs is that students vary in intelligence or educational potential, from high to low, and the institutions designed to educate them follow corresponding linear patterns from higher to lower quality.

While students clearly differ in IQ as it is currently measured, there are other factors to be considered when the goal is to optimize individual student learning. In addition to IQ, differences may include the level of student performance prior to entering college, and the scores students achieve on various standardized tests. There is considerable disagreement regarding the factors that drive these differences (Bain, 2004; Pew, 2007). For example, motivation is clearly a major factor (Deci, Vallerand, Pelletier, & Ryan, 1991; Sogunro, 2015). Motivation, in turn, is driven in no small degree by students' prior educational experience (Geddes et al., 2015). To what extent do students see education as providing valuable outcomes to their lives? Do students believe education is seen as valued by those people whose opinions they value? Furthermore, how likely do students think they can achieve positive outcomes if they put forth effort? Christensen et al. (2011) draw on Howard Gardner's work in "Multiple Intelligences" (Gardner & Hatch, 1989; Gardner & Moran, 2006), suggesting that students vary dramatically in the types of learning in which they excel. The fifth market – what we have called "specialty schools" – represents a much broader and more flexible category, designed to accommodate the variation of student backgrounds and learning styles. Such learning styles include:

- **Linguistic**: Ability to think in words and to use language to express complex meanings: Walt Whitman.
- **Logical-mathematical**: Ability to calculate, quantify, consider propositions and hypotheses, and perform complex mathematical operations: Albert Einstein.
- **Spatial**: Ability to think in three-dimensional ways; perceive external and internal imagery; re-create, transform, or modify images; navigate oneself and objects through space; and produce or decode graphic information: Frank Lloyd Wright.
- **Bodily-kinesthetic**: Ability to manipulate objects and finetune physical skills: Michael Jordan.
- **Musical**: Ability to distinguish and create pitch, melody, rhythm, and tone: Wolfgang Amadeus Mozart.
- **Interpersonal**: Ability to understand and interact effectively with others: Mother Teresa.
- **Intrapersonal**: Ability to construct an accurate self-perception and to use this knowledge in planning and directing one's life: Sigmund Freud.
- **Naturalist**: Ability to observe patterns in nature, identify and classify objects, and understand natural and human-made systems: Rachel Carson. (Christensen, et al., 2011, pp. 25-7)

By implication, a program that can build learning opportunities by individualizing opportunities around the learning styles and skills of individual students would be much more educationally effective. Such a strategy would have impact by directly influencing the students' ability to learn and indirectly by increasing their motivation (Christensen et al., 2011) – increasing their beliefs that education will produce valued outcomes and that they can actually succeed in the educational process (Geddes et al., 2015).

Note that the efficacy of customizing educational programs by learning styles is highly controversial (e.g. see Husmann & O'Loughlin, 2019). Clearly, any benefit will depend on how one conceptualizes learning styles, the way these styles are addressed in the instructional design, and how well the design matches with the content material being addressed. However, we accept as axiomatic that, at the very least, students will be more motivated to perform in programs that enable them to learn in a manner that they find more enjoyable, all else being equal. As we shall see in our discussion below, student motivation plays a significant role in our conceptualization of the educational process. How to incorporate the learning-style concept into actual educational programs remains an essential topic for research.

A program that individualizes opportunities around the learning skills of each student would require three critical inputs. First, at the overall educational economy level, there would need to be a set of diagnostic tools that identify and match individual student attributes with educational resources. Second, at the level of the specific educational institution, it would require access to the breadth of educational tools needed to serve the institution's students. And third, at the student level, it would require inputs (e.g., teachers) that administer the diagnostic tools that identify optimal educational resources for a given student and then provide such resources to that student.

Note that the role of the "teacher" no longer requires that he or she have content knowledge, but rather, requires that s/he can create a customized educational setting for an individual student. Hence, our characterization of the teacher as a "learning facilitator" rather than a source of knowledge. Of course, the facilitator would have to be generally very knowledgeable. However, the primary qualification would be that s/he be adept at recognizing the type of information a student requires, where the student might find that information in an modality appropriate to the student's learning style, and that s/he be interpersonally responsive to the students need for encouragement, reassurance, and confidence-building. In short, the facilitator would need to possess what Cannon, Feinstein, Friesen, and Yaprak (2013) characterize as individual absorptive capacity. More important, the facilitator would need to facilitate the development of absorptive capacity in students. As Cannon, Geddes, and Feinstein (2014) note, the requirements for facilitating this development is in many ways inimical to the structure of most business school curricula and the way our current generation of research professors are trained to teach.

Formalizing the Theory

In order to formalize our theory, we will again draw on the work of Cannon and his colleagues in their application of SDL to the educational problem. Following Cannon et al. (2013 and 2014), Geddes et al. (2015) addressed educational strategy by configuring the design of educational programs based on the level of student motivation and prior knowledge/skills. They addressed the motivation factor using the student's behavioral intention (*BI*, or in our notation, *B*) as formulated in Ajzen's (1991) theory of planned behavior. According to Ajzen's theory, a student's motivation to engage in the learning activities specified by a program would depend on six factors:

- **Belief strength**, or the student's belief regarding the likelihood that engaging in the activity will result in particular salient outcomes.
- **Outcome evaluation**, or the degree to which the student values the outcomes.
- **Normative belief**, or the student's belief that other relevant people will view their engagement in the educational activity in a positive manner.
- **Motivation to comply**, or the degree to which the student feels motivated to act in accordance with the views of the other relevant people regarding the educational behavior.
- **Control belief**, or the student's beliefs regarding what resources or opportunities are needed for successful completion

of the educational activity.

- **Perceived power**, or the student's belief that s/he has access to the resources or opportunities.

While it is obvious that behavioral intention will vary by student, Geddes et al. (2015) argue that the implicit assumption underlying many, if not most, programs in higher education is that the value of behavioral intention is 1.0, which is to say that motivation is not a relevant issue. They deal with students for whom motivation is an issue by excluding them through selective admissions standards or by seeking to motivate them with the threat of flunking out or receiving low grades.

In response to motivational issue, Geddes et al. (2015) propose a distinction between two educational strategies – what they call "informational" versus "transformational" programs. Informational programs seek to present the best, most up-to-date information to students and leave the problem of absorbing it to the students. Transformational programs seek to transform students into effective learners, developing students' individual absorptive capacity (Cannon et al. 2013; Cannon et al., 2014; Geddes et al., 2018). From our perspective, transformational education represents the type of disruptive educational innovation described in Christensen's work (Christensen et al., 2011).

In a 2016 follow-up study, Cannon et al. (2016) expanded their 2015 model by dividing operant and operand resources along three dimensions – knowledge and skills (*k*), motivation (*m*), and networking (*n*). In a 2017 paper, Geddes et al. expanded the model further by incorporating learning styles as a separate class of operand resources, with a corresponding class of operant resources designed to activate the learning-style operands.

We will use the Geddes et al. (2017) model as a starting place for our formal analysis, represented by Equation (1) below. We have incorporated two minor modifications. First, we use the subscript *i* to represent individual students, each of whom would be characterized by a unique set of operand resources, calling for a corresponding set of operant resources provided by the learning facilitator. The interaction of the operant and operand resources would take place in the form of educational activities, the intensity of which would depend on the student's behavioral intention.

The second involves our method for classifying learning styles. The Geddes et al. (2017) model uses Kolb's Nine-Region Learning Style Grid (Kolb & Kolb, 2005) as a basis for classifying learning styles. We will use Gardner and Moran's (2006) concept of multiple intelligences (summarized above) as a basis for learning styles, recognizing that individuals may excel in any number of these intelligences, thus providing a basis for classifying their operand resources in a particular class denoted by the subscript *j* in Equation (1):

$$V_i = f(R_{p,k,m,n,j,}\, R_{i,c,k,m,n,j}) \bullet B_i \qquad (1)$$

Where

V_i = Expected value to student *i* of planning to engage in the educational behavior

R_p = A relevant system of operant resources provided by one or more facilitators

$R_{i,c}$ = A relevant system of operand resources possessed by student *i*

k = An index representing the particular knowledge and skill components incorporated in the resources provided by the facilitator or possessed by the student

m = An index representing the particular motivational components incorporated in the resources provided by the facilitator or possessed by the student

n = An index representing the particular networking components incorporated in the resources provided by the facilitator or possessed by the student

j = An index representing the mix of learning styles being addressed in the facilitator and utilized by the student

B_i = Behavioral intention or the degree to which the student intends to participate in the educational activities

The strategy engaged by the learning facilitator ($R_{p,k,m,n,j}$) should be developed to exploit the strengths and address the weaknesses of the available student *i*'s resources ($R_{i,c,k,m,n,j}$). V_i represents the expected value to the student *i* of engaging in the learning activities determined by the facilitator. At the societal level, the sum of all students' value ($\sum V_i$) accrues to society as educated individuals contribute economically through the workforce and sociologically through interpersonal engagement (Alexander, 2014; Mitra, 2011). Given the inherently interactive way educated individuals function in society, we would expect a kind of multiplier effect, where the education of one student increases the value of another beyond the direct effect of the activities facilitated by any given educational institution. If *M* represents the multiplier effect in a given society, the actual value accrued to that society would be $M \bullet \sum V_i$. Having established the value of educational activities, we now proceed to discuss the costs.

As mentioned above, individualizing education requires three types of inputs: educational economy-wide diagnostic tools, educational institution-level access to operant resources ($R_{p,k,m,n,j}$), and student-level learning-facilitator time to diagnose student *i*'s operand resources ($R_{i,c,k,m,n,j}$) and to match those operand resources with the optimal operant resources. We add a subscript *i* to the operant resource variable to indicate the optimal set of operant resources for student *i*: $R_{i,p,k,m,n,j}$.

This leads us to a cost equation that considers each input:

$$C_i = C_D/I + C_P/P + C_{Vi} \quad (2)$$

Where

C_i = Expected cost of student *i* engaging in the educational activities

C_D = Expected cost of economy-wide operant/operand matching diagnostic tools

I = Expected population of students engaging in the educational behavior

C_P = Expected cost of an educational institution's access to operant resources

P = Expected population of independent educational institutions

C_{Vi} = Expected cost of matching an individual student *i*'s operand resources with the optimal operant resources

A facilitator applies the diagnostic tools created by inputs C_D in matching individual students' operand and operant resources, C_{Vi}. Therefore, C_{Vi} – the cost-efficiency of facilitated educational activities – decreases as our investment in diagnostic tools for matching operant and operand educational resources (C_D) increases. Further, with the availability of increasingly effective diagnostic tools, an educational institution may recognize that it does not need access to the full population of operant resources, but only those operant resources that are relevant for their student body (such as would be the case for specialized educational institutions). It then follows that the cost of accessing operant resources (C_P) also decreases as C_D increases. Note the following derivatives of C_{Vi} and C_P with respect to C_D:

$$\partial C_{Vi}/\partial C_D < 0 \quad (3a)$$

$$\partial C_P/\partial C_D < 0 \quad (3b)$$

Where

∂ = Partial derivative operator

A critical assumption in our interpretation of Equations (2), (3a), and (3b) is that the combined educational cost savings across students (decreases in C_{Vi}) and cost savings across education institutions (decreases in C_P) exceed the investment in diagnostic matching tools (increases in C_D). In addition to cost savings, better diagnostic tools likely accrue benefits through improvements to the value of educational activities (V_i from Equation 1). However, the cost savings and educational value improvements resulting from investments in diagnostic matching tools (C_D) will vary by the educational institution, depending on whether they adopt, and how they effectively use those tools in their educational programs. Nevertheless, we believe it reasonable to assume that, if diagnostic tools become an economy-wide research priority, the long-run effects would be a dramatic increase in overall educational efficiency and effectiveness. This increase is especially true when we consider the multiplier effect of educational activities. More effective diagnostic tools should not only increase the value of education for the individual students, but also create increased educational opportunities for students whose learning styles would have previously caused them to be selected out of the market for higher education. The result would net to more student value summed over a greater number of students, leveraged by the educational multiplier ($M \bullet \sum V_i$.).

IMPLICATIONS FOR THE STRUCTURE OF ACADEMIC INSTITUTIONS

Now, consider the implications that the aforementioned model might have on the structure of academic institutions, or, in our case, schools of business. From an implementation standpoint, our model suggests that the educational system will need to provide four essential functions:

- Formation of the knowledge and skills students will need to master in their programs.
- Incorporation of the relevant knowledge and skills into the presentation modalities that match with various student learning styles.
- Development of diagnostic tools for identifying the optimal available knowledge/skill packages and that best match the needs of individual students.
- Actual facilitation of the learning process, drawing on the aforementioned resources.

In practice, there is no reason the same faculty members might not be able to fill several different roles in the new academic environment. Indeed, this is the dominant model in many, if not most, of today's business schools. Research professors teach courses and, in many cases, are outstanding educational facilitators. Many of them package their expertise in the form of textbooks and other

presentation modalities that can be used by other professors across a broad range of universities. However, the skills required to perform these various functions are different, and even when a professor is proficient in all of them, time constraints and conflicting reward structures tend to get in the way of excellence in every area. We will therefore focus on roles rather than specific faculty positions. As universities mature and competition increases, we would expect educational institutions to develop a structure that fosters specialization around these four educational functions.

CONTENT RESEARCH

By "content research" we refer to academic research aimed at expanding our knowledge regarding the way business is conducted, the principles behind business success, and the skills needed to apply these principles in practical business situations. Without content research, or an alternative source of knowledge expansion, business schools would stagnate, having no choice but to rely on folk wisdom and the intuitive analysis of philosophers and/or practitioners.

PACKAGING KNOWLEDGE

Packaging knowledge refers to the process of converting what we have called "content knowledge" – the subject matter addressed in business school courses – to a form that can be used by other facilitators in their classes. Especially relevant to this paper is the notion of packaging the same components of knowledge in different ways that appeal to students with different learning styles. For examples, recall the configurations of Gardner and Moran's (2006) multiple intelligences.

Knowledge packages are critical to the individualized educational program we are proposing. They provide the diverse array of operant resources that learning facilitators will draw upon as they seek to address diverse patterns of student operand resources in an effort to create educational value, as portrayed in Equation (1).

The idea of packaging is not new. Publishing companies have packaged operant resources for years in the form of textbooks and an ever-broadening array of support materials. The speed with which the body of relevant knowledge is changing makes conventional text-book publishing, even on-line publishing with frequent updates, increasingly impractical for all but the knowledge principles that are not likely to change in the short term -- the enduring concepts and theories that, while discovered in the past, appear to have continuing relevance in our environment of accelerating accumulation of knowledge.

As we have noted in this paper, we see glimmers of a solution in the proliferation of open-source materials. These include MOOCs (massive open online courses – see mooc.org) offered by some of the best universities in the world, including such notables as Harvard and MIT. Youtube.com provides an enormous array of up-to-date video materials on virtually every subject imaginable. A growing number of podcasts address a similar array of up-to-date materials in audio format. Wikipedia and other free information sources available on the Internet provide real-time updated materials in written format. Google, Google Scholar, and other search engines provide an efficient tool for finding materials on the Internet. Particularly relevant to us are our own efforts through ABSEL, along with other scholarly associations designed to promote the development of more efficient methods for facilitating the transfer and utilization of business knowledge. The essence of "experiential learning" is to create meaningful, relevant experiences through which students can learn. We can interpret "meaningful" as incorporating experiences in a modality that matches a student's most productive learning style.

MATCHING-TOOL DEVELOPMENT

Developing tools for identifying optimal matches between the available knowledge/skill packages and the individual students' needs is critical to individualizing experiential education. Indeed, if the purpose of academic research is to enhance the educational effectiveness of our academic programs, optimizing the educational process for each student should be one of our primary concerns. In a general sense, this task also embodies much of what we do in ABSEL. The effectiveness of this optimization is ultimately expressed in the difference between the value of what we teach ($M \bullet \sum V_i$ aggregated across all business students) and the cost ($C_P/P + C_{Vi}$ aggregated across all business students).

As with content research, matching tool development does not need to be carried out within the university, but it is essential to the effective function of universities as a social institution. More relevant to our discussion, we note that the matching tool research and development could be leveraged across not simply business disciplines, but all educational settings in which students are matched with educational operand resources. Such leverage would decrease the per student cost of the matching tools. While it is possible that specific content may lend itself to a particular set of operand/operant resource matches – said another way, particular content may lend itself to students that learn in particular ways – those nuances would likely resolve themselves with student self-selection bias as matching tools become more refined and disseminated in the educational process. To illustrate, a student with an aptitude for spatial learning may find that she is less interested in and well-suited for financial accounting.

FACILITATING LEARNING

A central theme in this paper has been the emerging need to reconceptualize the role of the "teacher" from a dispenser of relevant knowledge to a facilitator of student learning. We have not yet specified what this would mean in practice. Nor is specifying the actual nature of a learning facilitator an easy task. However, our previous discussion provides some useful guidance.

Beginning with Equation (1), we see that the task involves matching available operant and student operand resources. Facilitators must be able to discern their students' operand resources (educational attributes, learnings styles, etc.) and understand which operant resources offer the best match. We anticipate this task will become increasingly more difficult as student audiences become more diverse, as we argue they will, or at least should if we are to develop an educational system that recognizes and caters to the multiplicity of learning styles.

When we look at the specific categories of resources denoted in Equation (1), both operant and operand resources include those related to knowledge (k), those related to motivation (m), those related to networking (n), and those related to learning styles (j). Thus, the qualifications of an ideal learning facilitator would include a balance between interpersonal, educational, and content-related expertise.

We envision those matching tools to include computer-based systems that catalog available resources, classifying them by their price, availability, overall quality ratings, and relative effectiveness for students with different learning styles. More sophisticated tools would provide assessment instruments to help identify the learning styles of individual students. In the absence of such systems, knowledge of the availability and characteristics of various knowledge packages and the ability to match them with student needs is a crucial requirement for effective learning facilitators

Motivation merits special attention. Christensen et al. (2011) argue that matching presentation modalities with student learning styles will have a positive impact on student motivation. Cleverly designed presentation packages can also incorporate motivational operant resources, for instance, by making them more engaging. Geddes et al. (2017) suggested several specific kinds of interventions an educator might make to motivate students to engage in a particular educational activity, (B_i) in Equation 1:

- Persuade a student to consider a particular educational behavior seriously enough to evaluate it as a possible option.
- Strengthen a student's beliefs regarding the positive outcomes of the behavior.
- Increase the value a student places on various educational outcomes resulting from the behavior.
- Strengthen the student's positive, and weakening of the negative, normative beliefs regarding social expectations relating to the behavior.
- Strengthen beliefs regarding the likelihood that the student will encounter a given resource or opportunity that would affect her ability to engage in the educational behavior.
- Strengthen a student's beliefs regarding the likelihood that the student will encounter a given resource or opportunity that would affect her ability to engage in the educational behavior.

SUMMARY AND CONCLUSIONS

We have presented a case for greater educational individualization. Underlying our presentation are three basic assumptions: First, Gardner and Moran's (2006) theory of multiple intelligences, reflected in their learning styles, suggests the distribution of different patterns of intelligence throughout our society. Second, even if differences in intellectual performance were not a function of readily identifiable patterns of intelligence/learning styles, differences in the ways individual students respond to education, attributable to the nature of their unique patterns of operand resources, would suggest that a more individualized approach to education would offer a substantial increase in educational productivity. In this paper, we propose a shift the focus of education from a group-oriented to an individually oriented system. This leads to the third assumption, namely that the value of the potential increase in educational productivity that would result from our suggested approach would be higher than the cost of developing the tools and institutional changes the approach would require.

We have taken a first step towards evaluating the third assumption by formulating the problem in general mathematical form (Equations 1, 2, 3a, and 3b). Although our formulation does not establish the validity of the third assumption, that the cost/ benefit of our proposed change justifies its acceptance, it does offer a model for its verification.

Finally, if we believe that the value of individualized education does indeed exceed its cost, this conclusion begs the question of how we might bring about the change. For instance, should the transformation result from government initiatives? Arguably, increasing the overall educational productivity of our future business leaders, and by extension, the economic productivity of the country, benefits the whole country, regardless of who pays for it. Such thinking would justify use of public money and/or other governmental interventions.

Alternatively, society could rely on private educational entrepreneurs to address the changes, being motivated by the differential advantage they might achieve by addressing the unmet needs of students who are underserved by our more traditional educational institutions. However, as we have pointed out, many of the necessary changes – sharing of research and development, free or low-cost packaging relevant knowledge, and the development of tools for matching knowledge packages that appeal to different study learning styles with students who would be most receptive to these packages – would benefit from education industry -wide leverage of effort and resources.

In our view, the most promising approach would be a mixed-mode effort. This mixed-mode would start by building on our current system of subsidized university-sponsored research and open-source research efforts. Adding to the value of the current system, we include companies/not-for-profit research organizations, combined with entrepreneurial efforts of schools of business as they seek a differential advantage in the educational marketplace. Along with the need to test the validity of our general proposal,

strategic analyses addressing how such a proposal might be implemented promises to be a fruitful area for future research.

As a final note, we have drawn heavily on Christensen's (Christensen et al., 2011) theory of disruptive innovation, as applied to educational institutions, as a general framework for understanding how business schools might individualize experiential education within a set of constrained resources. We have not addressed the actual problems of implementing the required changes within existing educational institutions. Christensen and his colleagues address this issue, extracting principles from Christenson's broader theory of disruptive innovation to discuss how organizational processes might be structured to facilitate the suggested innovations in an educational setting. There is, of course, a broad literature addressing the characteristics of organizations that tend to facilitate radical innovation (see Tellis, Prabhu, & Chandy, 2009). The organizational principles upon which educators might draw to implement the innovative programs we are recommending represent another fruitful area for future research.

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