

*Original Paper*

## Thinking About Your Thinking: Metacognition and the Adolescentizing of Online Higher Education

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### **Abstract**

*Online education is considered a modern landmark in Self-Directed Learning (SDL), but current trends place that characterization and the effectiveness of the delivery method in jeopardy. U.S. growth trends indicate increasing numbers and percentages of younger students entering virtual classrooms, compounded by wholesale shifts to online delivery in the wake of COVID-19. As the online arena transitions from working adults seeking educational access to entire undergraduate populations, online education appears to be evolving from an alternative delivery method into a ubiquitous form of higher education, thereby losing its identity as SDL and with all the pedagogical consequences such an evolution implies. Amid calls for increased student access and the continuing clamor for accountability, we examine differences in metacognitive awareness and regulation strategies in the multigenerational melting pot that has become undergraduate online education. While our findings indicate that younger students possess lower metacognitive capacity for maximizing online success and lead us to caution against wholesale implementation and its overuse for younger participants, we also offer considerations to help both faculty and institutions leverage the benefits of effective online delivery and encourage them to move beyond the stale methodologies that all too often separate motivated students from truly meaningful education.*

### **Keywords**

*online education, metacognition, self-directed learning, online learning, distance learning*

## 1. Introduction

Higher education faculty need little rehearsal regarding the growing popularity of online education. Multiple examinations tout the benefits and effectiveness of online delivery, including overall convenience, increased accessibility for the learner, and valid assessment of student learning outcomes. However, across the higher education landscape, especially during and beyond the COVID-19 pandemic, robust technology facilitating growing acceptance of virtual classrooms has propelled academia into an educational delivery paradigm shift with incomplete evidence of student capacity. Even after many years of evolving programming and delivery alternatives, only scant research exists on optimizing student outcomes and learning across the current spectrum of undergraduate education, including the expanding online environment. Treating all students as having similar cognitive skills and offering wholesale access to the same programs and delivery mechanisms reveals a vast gap in our understanding of effective learning capacity (Conrad & Donaldson, 2011; Gilardi & Guglielmetti, 2011; Kuong, 2015; Park & Choi, 2009). Without this understanding, college and university faculty may struggle to engage and effectively educate students to maximize learning, negatively impacting course completion, degree progression, and student success (Conrad & Donaldson; Jacobs & Hundley, 2010; Park & Choi; Sissel et al., 2001).

Professional associations and accrediting agencies such as the Association of American Colleges and Universities (AACU, 2018) and Southern Association of Colleges and Schools Commission on Colleges (SACSCOC, 2018) emphasize strategic attention to program quality standards, noting that “the quality shortfall is just as urgent as the attainment shortfall” (AACU, 2010, p. 1). Continuing online growth across the spectrum of learners in higher education offers ideal opportunities to examine, and perhaps evolve, strategies that maximize learning. Traditional behaviorist and cognitive approaches no longer suffice, especially against the backdrop of the current pandemic as colleges and universities shoehorn students, no matter their preferences, into forced online delivery. Metacognition, those strategies and approaches students apply to thinking and learning, plays a key role in maximizing learner success, and faculty must understand the needs of the online student demographic in order to develop and implement practices that provide all students with opportunities to become competent thinkers. As institutions continue to shift significant portions of their curricula online, the need for assessing these factors and our roles as educators in addressing them could not be timelier (Burt, 2020).

### *1.1 Review of Literature*

The allure of baccalaureate programs has remained high, and in some cases skyrocketed, with the conferral of degrees since the early 1970s increasing from 840,000 to over 1.9 million (U.S. Department of Education, 2020). Beyond the continuing influx of traditional students into college and university programs and fueled by various state completion agendas and incentives, these burgeoning numbers reflect a dramatic demographic shift as increasing numbers of students converge upon undergraduate classrooms and tens of thousands of stopped-out adults return to complete degrees, widening the gap in the learning needs and capacities of students accessing our offerings (Bruns & Bruns, 2015; Donavant,

2009a, 2009b; U.S. Department of Education). With 39 states currently in the Complete College America (CCA) alliance promoting significant increases in the overall number of students completing degrees (CCA, 2018; Colvard, Watson, & Park, 2018), the response to increased demand includes an explosive growth in online delivery, with some disciplines boasting more than one in four programs delivered fully online (Sloan, 2018) even before the recent COVID-induced onslaught.

Vastly different from the 1980s when applied fields struggled to shake the widely held perception of holding little regard for intellectual rigor, undergraduate students and scholars now routinely address a wide array of contemporary issues through research impacting numerous policy arenas. Robust curricula and research agendas advance theory and inform the broad base of current knowledge for both students and society. Within the more traditional liberal education disciplines of psychology, sociology, political science, education, and research, even more applied fields such as criminal justice have established themselves as legitimate scholarly disciplines and added to the explosive growth in baccalaureate education. For example, sociology has remained among the top three most popular academic disciplines since 1971, with almost 160,000 baccalaureate degrees now conferred annually in the United States. During the same period, psychology rose from 7<sup>th</sup> to 4<sup>th</sup>, with more than 117,000 degrees conferred, and criminal justice catapulted from 29<sup>th</sup> to 9<sup>th</sup>, with more than 62,000 (U.S. Department of Education, 2020). The continuing popularity of undergraduate programs is no different within the virtual arena. With up to 25% of some programs now offered fully online (Sloan, 2018) and numerous online courses supporting increasingly significant portions of the remaining “traditional” offerings, the general benchmark of most programs delivered online seems to be to try to make the online class as good as its traditional counterpart. We define online delivery and online education as instructional material transmitted and delivered via personal computers to learners at locations remote from that of the instructor(s), including postings and instructional materials, discussion boards, synchronous or asynchronous chat, and other methods that allow self-paced, interactive, and individualized learning. Although a great deal of research addresses the general feasibility of online delivery and the use of technology within formal educational settings, notoriously little explores the combined roles of student demographics and learning strategies in determining educational success (Bali, 2014; Donavant, 2009a; Sitren & Smith, 2017). Rather, the overwhelming majority of research compares online education to traditional face-to-face instruction; and, while a few researchers tout positive results as evidence of online effectiveness, the equality question has long been answered and resulted in a no-significant-difference stalemate that does little to inform or enhance meaningful online delivery of academic offerings (Donavant; Sitren & Smith; Stack, 2013, 2015). The more pertinent question becomes how best to leverage the myriad technological options and instructional techniques available to achieve the greatest learning improvement within the expanding online environment. Is the increasing use of virtual classrooms a legitimate tool helping all students derive the greatest educational access and benefit or simply a convenient gimmick to lure participants to a continuing educational cash cow keeping colleges and universities afloat?

As university students increasingly delve into the perceived convenience and anticipated autonomy of the online environment, many remain ill-prepared to succeed without the benefit of on-site instruction (Nilson & Goodson, 2018). In the past year, three in four undergraduate students report losing touch with their institutions and that online delivery has negatively impacted their education, with freshmen and sophomores, i.e., younger students, reporting the greatest disconnect (Ascione, 2020). Metacognition, or self-regulated learning, plays a key role in student achievement and academic success (Flavel, 1979; Hattie, 2009). Flavel defined metacognition as awareness that involves active control over the learning process and planning the way to approach a learning task, including both awareness of one's abilities and knowledge as well as the ability to change one's mental strategies in order to maximize learning. Hattie (2009) noted that many students lack cognitive awareness, often failing to demonstrate appropriate self-regulation and lacking insight for where they fit in the learning process. Ruohoniemi and Lindblom-Ylänne (2009) also identified personal effort, motivation, and cognitive strategies as instrumental to learning but key noted that these factors often were not recognized or embraced by students. This was especially true in younger students who believed that education was something done "to them" by others and not something in which they should take an active role. Conversely, Justice & Dornan (2001) found that older students reported more use of higher-level study strategies compared to their traditional-aged collegiate counterparts. Among possible reasons for these differences, longitudinal neuroimaging research demonstrates that neural impulses in the prefrontal cortex, an area responsible for higher-order cognitive processes and executive functions needed for goal-directed behaviors, does not fully develop until the mid-20's (Anderson et al., 2001; Giedd, 2008).

Beyond student affairs offices and institutional support resources, the bulk of responsibility for developing effective student success strategies rests with faculty and the instructional methods they employ (Donavant et al., 2013; Mager, 1997; Rachal, 2002), yet two in three faculty also report feeling disoriented to this "new normal" of higher education (Lucas, 2020). Increased blending of older and younger students into mixed-age classes bring significant challenges in terms of what learners want, expect, and need from faculty and the educational experience. Understanding the unique characteristics of adults compared to traditional-age college students can shed light on how different generations respond and which methodologies enhance the experiences of all learners (Donavant et al.; Sitren & Smith, 2017). The Self-Directed Learning (SDL) construct (Brockett & Hiemstra, 1991; Tough, 1971) offers an ideal pedagogical lens for examining metacognition among the current student demographic and informs faculty regarding the types of educational experiences necessary for online student success. SDL, from which online education is a direct descendent, primarily emphasizes three dimensions consistent with metacognition: the learning process or methodology employed, personality characteristics of the learner, and factors within the learner's context. A fourth cognitive dimension includes responsibility for meaning-making of the experience with the intent to meet one's learning goals, of which self-regulation, or metacognition, is a critical aspect (Brockett & Hiemstra, 1991; Hattie, 2009; Pintrich, 2004; Ruohoniemi & Lindblom-Ylänne, 2009; Song & Hill, 2007). These defining

characteristics emerge from the broader field of adult education, in which early pioneers such as Lindeman (1926/1989), Martin (1926), and Bryson (1936) noted the critical importance of not age but maturity, intellectual initiative, and voluntarism. This is not to say that 17-, 18- and 19-year-olds lack SDL capacity, and federal education law defines an adult as an “individual who has attained the age of 16 or is beyond the age of compulsory school attendance under State law” (U.S. Code, 1989, p. 608). But beyond the completion agenda’s and most states’ lines of adult demarcation at age 25, general definitions of adult education and SDL rarely mention specific age. Lindeman held that adult education is not confined to adults but hinges upon maturity. Knowles’ (1984) adult education concept of andragogy, a touchstone for advocates and critics alike, contrasted the self-directedness of adult learners as qualitatively different and potently motivated by greater recognition of the learning task and self-confidence. Noting that failure to recognize learners’ perspectives alienates them from the educational experience and creates feelings of personal rejection that negatively impact the endeavor, he also understood the continuum upon which both pedagogy and andragogy appropriately exist dependent upon educational circumstance and setting. Brookfield (1986) identified the essential element of a change in consciousness among adults in which critical reflectivity drives learning, a concept consistent with effective online education where students operate at least somewhat independently but not seemingly congruent with what most faculty would recognize as the average undergraduate student. Online delivery’s dependence on an educator who is only partially present illustrates the need to facilitate students’ transitions from the face-to-face environment to the virtual arena through a “metagogy” of blended learning techniques. For SDL purists, Knowles’ (1980) andragogy is best embodied in those environments supporting mature, motivated adults, where learners attach meaning from their experiences to enhance learning and consequently drive their own educational ventures. Andragogy stresses the importance of learners serving as knowledgeable resources for themselves and each other. The converse didactic pedagogical model involves the transmittal of fact-laden lectures to passive recipients combined with rote memorization and examinations, a predominate approach with traditional-aged college students who, despite increasing numbers of adults entering undergraduate programs, still comprise the bulk of baccalaureate enrollment. A more practical and comprehensive SDL approach merges these theoretical extremes and suggests that intrinsic motivations can appropriately and successfully drive learners’ efforts, including planning and monitoring one’s own learning through metacognition and reflection. Tough (1971) and Brockett and Hiemstra (1991) recognized that learning may well progress with or without others’ assistance and that this assistance does not necessarily invalidate the SDL construct. Similarly, metacognitive students exhibiting independence, self-discipline, and self-confidence often need direct support and varying levels of faculty instruction to become proficient (Ruohoniemi & Lindblom-Ylaine, 2009). It stands to reason, then, that younger, less mature students viewing education as something externally driven may struggle to employ effective strategies in the online environment often void of this support. Faculty must understand metacognitive capacity before determining appropriate strategies for maximizing student success. Many instructors’ greatest strengths include orally

relating various examples of practical application, yet faculty often struggle to find ways to incorporate this component into their online courses. Online education is not the same experience as researching a topic, compiling notes and supporting material, and standing before passive groups of students didactically delivering information (thank goodness!). In too many instances, however, excellent classroom facilitators attempt to bundle their material and “stick it online” in the form of the same static presentations they use in face-to-face settings (Bernat & Frailing, 2015; Donavant, 2011). This leads to frustration for both the facilitator who does not understand why students are not “getting it” and the learner who is *forced* to self-educate, a situation inherently antithetical to the optimal tenets of SDL and in conflict with the metacognitive capacity of many undergraduate students. Imposing performance standards and student success criteria upon educational ventures not aligned with their learning styles creates punitive attitudes toward the endeavor and often results in anger and a lack of motivation toward future attempts (Brockett, 1992; Donavant, 2009a). At best, students come away from these experiences exasperated that they paid tuition to enroll in a course when they could have learned just as much by simply buying the book and reading it on their own.

## 2. Method

### 2.1 Background

Understanding the make-up and capacity of the student base remains a critical component of any evaluation of effective online education, especially within the rapidly expanding online arena and as the field continues to address the continuing criticism of low-quality academic programs accused of attracting below-average students (Sloan, 2018). Our purpose is not to denigrate the value or validity of online delivery as an effective mechanism for both increased access and student success within higher education. Rather, it is to examine the metacognitive awareness and regulation strategies across students in the multi-demographic melting pot that has become undergraduate online education to maximize the benefits of this already effective delivery method. The majority of online delivery research has been from a top-down perspective reflecting the expectations of administrators and faculty who often fail to understand students in ways that inform and maximize the educational experience (Donavant, 2011; Ortiz-Rodriguez et al., 2005; Sloan; Stack, 2013). Even among studies based upon learner surveys and other forms of direct assessment, participants merely assessed those aspects of the experience already determined by program developers and providers as appropriate for evaluation, usually resulting in little more than “I-like-it” measures of success and contributing to the widening gap between scholarship and practice (Caffarella & Daffron, 2013; Finckenauer, 2005; Howell, 2002; Merriam & Simpson, 2000; Nadler & Nadler, 1994). Previous studies indicate that myriad circumstances and demographic considerations affect learning success, particularly within the online environment, including educational level, familiarity with and previous exposure to the educational methodology employed, gender, race, age of the learner, and metacognitive capacity (Anderson et al., 2001; Donavant, 2009a, 2009b;

Donavant et al., 2013; Giedd, 2008; Hattie, 2009; Justice & Dornan, 2001; Ruohoniemi & Lindblom-Ylänne, 2009; Sitren & Smith, 2017).

## 2.2 The Present Study

Rather than assess learners' perceptions of the educational experience, this study used the Metacognitive Awareness Inventory (MAI; Schraw & Dennison, 1994) to examine students' awareness of their cognitive knowledge and their regulation of cognition, and whether differences in metacognition were related to the demographic factors of cisgender, age of the learner, and number of years of formal education received. The 52-question MAI is one of the most widely used instruments for assessing general self-regulated learning skills across disciplines. The instrument measures two factors of metacognition: cognitive knowledge and cognitive regulation. Schraw and Dennison found these two factors to be reliable measures,  $\alpha = .90$  and intercorrelated,  $r = .54$ .

Cognitive knowledge reflects conceptual knowledge or what students know about their learning and includes three subcategories: declarative, procedural, and conditional. Declarative knowledge refers to factual knowledge of one's learning abilities, procedural knowledge to knowing how to implement learning strategies, and conditional knowledge to the "when and why" to use these strategies. Cognitive regulation corresponds to how students monitor, evaluate, and control their learning, and includes five subcategories: planning, information management strategies, comprehension monitoring, debugging strategies, and evaluation. Planning reflects the ability to think ahead or plan for learning by actively setting goals and allocating resources, while information management strategies include how one processes information more efficiently, for example, organizing, elaborating, summarizing and selectively focusing on key topics. Comprehension monitoring includes self-assessment of employed learning strategies, i.e., using the most effective and efficient strategies and doing so correctly. Debugging strategies correct learners' comprehension and performance errors, and evaluation analyzes performances and strategic effectiveness after a learning episode.

Researchers administered the MAI to undergraduate students enrolled in several liberal arts programs of study at a mid-sized public regional university in the United States. Participants were recruited through the university's exclusive undergraduate research platform, and faculty directed interested students to the site where the online survey was posted. To recruit additional adult participants, a dedicated survey link also was emailed to students enrolled in the university's adult degree completion program. To prevent duplicate participation, the university's research platform software limited each participant to one iteration of the MAI instrument. Participants remained anonymous, received no incentives, and could withdraw from participation at any time without penalty.

## 3. Results

The comprehensive assessment of the results of this study includes descriptive data of the participants and results of the statistical analyses, followed by a summary and discussion of the major findings.

### 3.1 Descriptive Data

Of the 181 students who started the survey, only 161 respondents completed the instrument and were included in the final data set, 47 males and 114 females. There were 41 adults ( $M = 35.65$ ,  $SD = 8.43$ ), and 120 preadult learners ( $M = 19.98$ ,  $SD = 1.66$ ), with adults defined as those 25 years of age or older. The adults averaged 103.44 ( $SD = 36.32$ ) cumulative academic credit hours, not including the hours in which they were currently enrolled, while the preadults averaged 49.26 ( $SD = 36.28$ ).

### 3.2 Statistical Analyses

To test the hypothesis that older students would have greater awareness of their metacognitive knowledge, including declarative, procedural, and conditional, a series of independent sample t-tests were performed because assumptions were met for all variables. Adults demonstrated statistically significantly higher levels of declarative,  $t(158) = 1.96$ ,  $p = .05$ ,  $r = 0.024$ , and procedural knowledge,  $t(158) = 2.44$ ,  $p = .016$ ,  $r = 0.037$ , but not conditional knowledge,  $t(158) = 1.32$ ,  $p = .89$ ,  $r = 0.01$  (see Table 1).

**Table 1. Means and Standard Deviations for Metacognitive Knowledge**

Metacognitive Knowledge	Age Group	Mean	SD	n
Declarative	Preadult	6.07	1.71	120
	Adult	6.65	1.16	41
Procedural	Preadult	3.17	0.92	120
	Adult	3.55	0.59	41
Conditional	Preadult	4.13	1.06	120
	Adult	4.37	0.80	41

Testing the hypotheses that older students would have enhanced regulation of their metacognition, including the active strategies of planning, information management strategies, comprehension monitoring, debugging strategies, and evaluation, a second series of independent sample t-tests was performed. Adults demonstrated statistically significantly higher levels of planning,  $t(158) = 2.74$ ,  $p = .007$ ,  $r = 0.045$ ; information management strategies,  $t(158) = 3.72$ ,  $p < .05$ ,  $r = 0.081$ ; comprehension monitoring,  $t(158) = 2.62$ ,  $p = .010$ ,  $r = 0.042$ ; and evaluation strategies,  $t(158) = 2.25$ ,  $p = .026$ ,  $r = 0.031$ ; but not debugging,  $t(158) = 1.75$ ,  $p = .08$ ,  $r = 0.019$  (see Table 2).



**Table 2. Means and Standard Deviations for Metacognitive Strategies**

Metacognitive Strategy	Age Group	Mean	SD	n
Planning	Preadult	6.94	2.12	120
	Adult	7.98	1.86	41
Information Management	Preadult	4.80	1.96	120
	Adult	6.03	1.18	41
Comprehension Monitoring	Preadult	5.00	1.68	120
	Adult	5.78	1.44	41
Debugging	Preadult	4.32	0.85	120
	Adult	4.57	0.67	41
Evaluation	Preadult	3.74	1.54	120
	Adult	4.40	1.78	41

Independent sample t-tests on the three metacognitive knowledge categories, as well as the five active strategies, revealed no statistically significant sex differences. Pearson correlations between the number of academic credit hours a student had completed revealed statistically significant correlations with information management,  $r(160) = .161, p = .040$ , and debugging strategies,  $r(160) = .25, p = .001$ .

#### 4. Discussion

This study's findings offer significant implications regarding which students may be better suited for success within the inherently SDL context of the online environment. With its comprehensive liberal arts focus, the public regional institution setting of the study offered an appropriate forum to examine learner capacity and metacognition across the undergraduate student population, and the wide array of academic disciplines and programs of study represented by the respondents bolster the relevance of the findings among college students. All respondents demonstrated levels of metacognition sufficient to employ effective learning strategies to at least some degree, but the findings also revealed that all students may require some level of guidance at various times, supporting previous perspectives that assistance does not necessarily contradict metacognitive capacity or invalidate the SDL construct inherent to online delivery (Brockett & Hiemstra, 1991; Ruohoniemi & Lindblom-Ylänne, 2009; Tough, 1971).

First and foremost, the findings demonstrate that learning and academic success can occur across the undergraduate spectrum, a huge boon validating online delivery within higher education. However, the results reflected higher levels of metacognition among adults in both cognitive knowledge and regulation,

and therefore more effective transferable strategies for maximizing learning within the online environment. Significantly higher levels of declarative and procedural knowledge indicated that not only did adults better recognize their own learning capacities, i.e., they recognized when they grasped or struggled with the concepts being presented, they better understood how to implement effective strategies to maximize their learning experiences. Adults also demonstrated significantly higher capacities for planning, monitoring, controlling, and evaluating their learning. Greater planning capacities for actively setting learning goals and allocating resources to maximize success offer especially valuable commodities for students in asynchronous, self-paced online classes. More highly developed information management strategies enable adults to process information more efficiently than their traditional-aged counterparts, selectively focusing on and prioritizing key topics, better organizing course content, and elucidating robust and valid practical applications. Higher levels of comprehension monitoring facilitate self-assessment and correct application of the most effective and efficient learning strategies during the endeavor, and higher evaluative capacity helps older students better analyze performances and strategic effectiveness after a learning episode, thereby informing future strategies for success. Interestingly, adults and pre-adults did not significantly differ in their levels of conditional knowledge nor debugging strategies, indicating that both groups may require guidance at various times to understand when and why to use particular strategies and how to correct certain performance errors. These findings inform discussions for improving online higher education praxis, both for administrators making strategic decisions for institutional directions and faculty who interact directly with students.

The increased use of online delivery reached critical mass as institutions shifted entire student populations online as the go-to pandemic alternative. Prior to COVID-19, a relatively miniscule percentage of faculty provided the bulk of online offerings, leaving most woefully unfamiliar with the nuances of effective online delivery as entire institutions thrust wholly into virtual education. Against this backdrop, higher education continued to embrace newly revealed deficiencies, or at least the scope thereof, in online education. For example, the U.S. Department of Education coronavirus response leveraged temporary policy revisions to provide flexibility for institutions moving fully online into new permanent regulations providing online competency upgrades better defining student-faculty interaction (Zalanick, 2020b). Several leading institutions, recognizing differing maturity levels of their students and their respective capacity for online success, formulated strategies for identifying which students should return to traditional classrooms as soon as possible and which could reasonably remain online (Zalanick, 2020a). These divergent actions contrast high level administrative perspectives facilitating wholesale online delivery against faculty and academic leaders' recognition that one size truly does not fit all.

Administratively, the institutions that have most successfully navigated the recent turbulence demonstrate the necessity of nimble but austere contingencies and a willingness to implement them to maintain some level of continuing educational delivery in the midst of plunging revenues and significant budget deficits across COVID-shuttered campuses. But neither the immediate fiscal crisis nor budgetary efficacy from the more methodical paradigm creep toward increased online delivery in recent years

justify or validate wholesale institutional transitions to the virtual environment as sustainable solutions. Ultimately, student success hinges not upon campus-level strategies that rightfully adjust to accommodate external challenges but upon student-faculty interaction that leverages appropriate methodologies to maximize learning. Indeed, regional accreditors such as the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC, 2018, p. 44) note “qualified, effective faculty members are essential to ensure the quality and integrity of academic programs” and identifies the instructor of record as “the person qualified to teach the course and who has overall responsibility... for the achievement of student learning outcomes.”

Faculty own the responsibility to embrace this accountability through appropriate teaching and engagement strategies, but many fall short because they define themselves primarily in relation to a content area rather than as educational practitioners (Merriam & Brockett, 2007), admittedly adhering to the only type of education they understand: a didactic approach that ignores differences in metacognition and learning strategies, and ultimately devalues demographic variables within mixed-aged classes (Donavant et al., 2013). Simply put, most faculty do not fully understand basic tenets of educational methodology or the SDL construct of online delivery. How, then, could they reasonably understand variances in metacognition or create classrooms fostering generational learning perspectives and inclinations that add value to the educational experience? Fortunately, academia is uniquely suited for closing (or at least bridging) this gap negatively impacting student success and resulting in so much wasted faculty capital, but a more deliberate effort on the part of the university community is needed to address the lingering problem of pedagogical inequality. Previous calls (Brooks & Heiland, 2007; Donavant et al., n.d.) for extensive redesign of doctoral curricula to include better preparation for teaching may have merit. Meanwhile, current practitioners ought to explore nuances of instructional methodology along the pedagogical continuum. Institutions should continue to invest in robust online platforms, but, more importantly, they must provide necessary and related support services adequately equipping faculty to maximize the effectiveness of these delivery resources.

To meet students’ needs in ways that facilitate better engagement and maximize online learning, the professoriate should understand and implement effective strategies to ameliorate impediments hindering student success in the inherently SDL online context (Donavant, 2011; Nilson, 2013). Nilson and Goodson (2018) noted that direct student-faculty interaction clarifies meaning and deepens student understanding of critical concepts to provide the greatest efficacy, both in overall higher education and in online delivery. For example, one would be hard-pressed not to acknowledge the value of faculty perspective and expertise as primary strengths in the traditional face-to-face classroom, whether employing didactic methods with younger recipients or facilitating seminars for more mature learners. All too often, however, online delivery employs only minimal faculty interaction, instead relying upon the use of static presentations and asynchronous typed “discussions” in a dismal attempt to overcome this unfortunate and challenging reality (Bernat & Frailing, 2015; Clark-Ibanez & Scott, 2008; Donavant; Miner-Romanoff, 2014). Many faculty also attempt to increase student engagement by incorporating

materials from the growing array of Online Educational Resources (OER) available through social media and other providers (Colvard et al., 2018), and several studies suggest that their use contributes to increased student performance (Feldstein et al., 2012; Fischer et al., 2015; Pawlyshyn et al., 2013). Of course, the use of supplemental materials to provide currency to course topics and inform theoretical perspectives is a common and appropriate practice within academia, and faculty unequivocally should maintain full freedom in their pursuit of academic duties. But overreliance on OER or other static methodologies as substitutes for genuine interaction, all-too-common realities in the remoteness of the online environment, minimize student success by forfeiting invaluable faculty expertise and support. We agree with Bernat and Frailing, that an appropriate balance between technology and social presence in both course materials and instructional delivery remains critical, with faculty holding the responsibility for making these determinations.

The results of this study provide not only valuable insight into sound online education practice, but an impetus for future research. The issue of whether wholesale online delivery facilitates or diminishes higher education is worthy of further empirical investigation, and replications of the study with larger or multiple cohorts may enhance the reliability of the results found here. The findings support assertions that many students need more than the convenient access online delivery provides or an online collection of static content; indeed, the results validate a metagogy of educational techniques across the increasingly diverse online student demographic and support previous perspectives regarding mixed-age undergraduate classes. It is hoped that this study has provided insight into which students may benefit most from online participation and that faculty must better understand and employ various instructional methodologies to maximize their successes. As more and more learners embrace their need for higher education and increasingly do so through the online arena, we must provide them – all of them – with strategies that enrich their experiences within that environment. As faculty, we must be willing to attempt new techniques, including forays into the rapidly evolving virtual classroom, but we must do so within the parameters of sound educational practice. Rachal's (2002) distinction between the *science* of education and its *art*, and his perspective that the comingling of adults with younger students often devolves education “into a pale reflection of the ideal” (p. 212) is well taken. Genuine education is all about our students: what *students* need; what *students* expect to gain from the experience; and, how faculty and institutional communities can best meet *students'* needs and expectations as they are taught and mentored by exceptional faculty facilitating journeys of discovery and application. Online delivery has its legitimate place, but one size truly does not fit all, and we must develop the appropriate balance to bridge the gaps between motivated learners and the static methodologies that separate them from truly meaningful education.

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