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Multimedia Intentional Learning Ecosystems (MILEs): The Probable Relationship between Anxiety, Self-Efficacy, and the COVID-19 Fallout

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ABSTRACT

Recent developments in flexible learning and online teaching due to the global COVID-19 pandemic have sought to link the attributes of high-quality instruction with social constructivists' theories to provide an ethical compass for navigating sustainable Multimedia Intentional Learning Ecosystems (MILES). Despite lingering doubts about the design and implementation of such ecosystems, belief in the perceived benefits motivates educators to persist. Research about methodology has revealed contradictory results that have not broken new pedagogical ground. Despite looking good on paper, the effectiveness and real-world utility of such guiding principles are often difficult to assess because the principles do not facilitate the development of self-efficacy. Initially, the proposed methodology was of a follow-up sample web survey. However, such a survey would suffer because only a snapshot would be captured. Consequently, the web survey evolved into a non-equivalent pretest-posttest control group Internet quasi-experiment. Teaching staff with traditional, minimal or no online teaching experience should not have to be reliant on trial and error to learn about how to teach effectively post the global COVID-19 endemic. There is little use in knowing what instructional technology has to offer unless educators are confident to step forward knowing when, where and how to best use instructional technology to support learning. The validation of DLISt7 by factor analysis to promote the use of the concept as a toolkit for educators coming to terms with or transitioning to flexible learning and online teaching in response to the global COVID-19 fallout.

Contribution/Originality: This paper's primary contribution is the validation of DLISt7 by factor analysis to promote the use of the concept as a toolkit for educators coming to terms with flexible learning and online teaching in response to the global COVID-19 endemic.

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1. Introduction

"To begin at the beginning, no one forgets a good teacher" (Moore, 2004, p. 4). As an educator have you ever stopped to wonder how successful we have been at leveraging what the personal computer (PC) and the Internet have to offer? Furthermore, there is little use in knowing what instructional technology has to offer unless educators are confident to step forward knowing when, where and how to best use instructional technology to support learning. Teaching staff with traditional, minimal or no online teaching experience should not have had to be reliant on trial and error to learn about how to teach effectively post the global COVID-19 endemic, while at the same time scrimmage with the idiosyncrasies of the modern online environment (Haughton & Romero, 2009).

Undoubtedly "2020 has been one of the most challenging years yet. As organisations grapple with major global disruptions caused by an invisible mutual enemy, there may very well be no return to business as usual" (Nora Manaf, 2020, p. 4).

> *... for organisations that have future-proofed their operations, the pandemic has been the ultimate stress-test, paving the way for improvements and further enhancements.... While technology is an enabling tool at the workplace, ultimately capability-building by upskilling and providing anticipatory support mechanisms are what empowers people to be their best. We can't control the wind but we can adjust the sails, is very apt.... During a time where only change is constant and evolving faster than all the past industrial revolutions, clearly a resilient and agile workforce through reinvention and redesign is crucial in surviving a revolution brought about by an infectious virus* (Nora Manaf, 2020, p. 4).

Driven by a tailwind for flexible learning and online teaching in higher education, research about methodology has revealed contradictory results that have not broken new pedagogical ground (Garrison et al., 2010). According to O'Keefe et al. (2020) "educators and institutions [still] need more help understanding how to effectively design, develop, and deliver high-quality instruction online" (p. 2). Furthermore, because during this current crisis many institutions, educators and students alike have been found wanting for better access to technology and resources the "need is greatest for educators at institutions serving low-income students, first-generation students, and students of color who will likely be disproportionately affected" (O'Keefe et al., 2020, p. 2).

Recent developments in flexible learning and online teaching due to the global COVID-19 pandemic have sought to link the attributes of high-quality instruction with social constructivists' theories to provide an ethical compass for navigating sustainable Multimedia Intentional Learning Ecosystems (MILES). According to Gomis et al. (2022) the findings from their study "set-up a significant room for improvement in teaching and pedagogy to enhance student performance in BEHE [Built Environment Higher Education]" (p. 12). Despite lingering *anxiety*, defined as a feeling of anxiousness when motivated to impress others but having self-doubt at the same time, belief in the perceived benefits motivates educators to persist (Myers, 2015). "In an intentional learning environment, students learn to set goals, generate and interrelate new ideas, link new knowledge to old, negotiate meaning with peers, and relate what they learned to other tasks" (Snowman et al., 2012, p. 359). Such cognitive preorganization is perhaps what

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educators desire when imagining how to produce agile and resilient next-generation graduates using high-quality instructional technology as an enabling tool despite the ultimate stress-test of our time.

> *"Upon the announcement of the first Movement Control Order (MCO), we were alerted by university management to immediately transform the conventional pedagogy into digitally enhanced teaching and learning activities and online assessment"* (Ngeow, 2020, p. 5).

> *Despite mastering some online tricks to conduct virtual classes… We have lost the 'personal touch' with our students…. We have gone through a steep learning curve that is stressful for everyone. The incidents are preparing us for future virtual classes that are well designed, durable, and self-paced… without compromising learning outcomes* (Ngeow, 2020, p. 5).

Hence, the purpose of this study is to lay the foundation for a future investigation about the relationship between anxiety, self-efficacy, and the COVID-19 fallout. Is it possible that this current crisis has laid bare the missing link between cognitive presence, social presence, teaching presence, and strategies or tactics for online learning and teaching (Kehrwald al., 2005)? Within the context of this study, issues associated with innovation complexity and obscurity of results best explain why lingering doubts about the effectiveness, efficiency, and engagement of online learning still exist (Syaril Izwann, 2007)**.** Maybe "this [is the] international health crisis [that] has put many of education's shortcomings on full display" (Keefe, 2020, p. 220).

According to Driscoll (2020) "because the current unprecedented pandemic has accelerated [his] university's latest *Teach less, learn more* approach in its Curriculum Framework, developed to encourage student independent learning" (p. 4), perhaps there is now a global-local context that can be used as an example of how an organization can adapt to change because of the global COVID-19 endemic.

Undoubtedly, the need for a guiding philosophy that educators can adapt easily based upon their acumen, course content, student population, teaching style, and available technology continues to gather momentum (Shneiderman, 1998). For example, it has been recommended based on findings from research about the widely-accepted Community of Inquiry (CoI) framework that learning presence should be integrated as a new conceptual element (Shea et al., 2012).

Thus, it is proposed that for the science of learning and the art of teaching (Skinner, 1968) to be more effective and efficient in a post-COVID-19 world, the selection of appropriate pedagogy should consider the systematic use of conscientious and contextual engagement. This is because the world's population needs an education for which "the demand cannot be met simply by building more schools and training more teachers" (Skinner, 1968, p. 29). Instead, the emphasis should be on education becoming more efficient through revision of curricula and improvement of classroom materials and techniques using the latest available technology (Skinner, 1968, p. 29).

2. Literature Review

2.1. Assimilating Instructional Technology with Good Pedagogy

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Pedagogy is defined as the function of teaching, or what teachers do to assist their students' learning (Lever-Duffy et al., 2005). On the one hand, there is the law of conditioning that states "if the occurrence of an operant is followed by the presentation of a reinforcing stimulus, the strength is increased" but on the other hand, the law of extinction states that "if the occurrence of an operant already strengthened through conditioning is not followed by the reinforcing stimulus, the strength is decreased" (Skinner, 1938, p. 21). Thus, there are two basic types of reinforcing stimuli, positive and negative, in which "the cessation of a positive reinforcement acts as a negative [and] the cessation of a negative as a positive (Skinner, 1938, p. 66).

In précis, this is the essence of what online pedagogy is in its most rudimentary form. The fundamental idea is that of a flashlight. A teacher can in principle flick the switch on when required, and keep it switched on for his students to illuminate their journey through the pathways of knowledge (Syaril Izwann, 2013). Anderson and Dron (2011) have so far summed it up best when they said that quality online learning experiences exploit all "three generations of cognitive-behaviorist, social constructivist, and connectivist pedagogy" to encapsulate what distance education has evolved into (p. 1).

What is not desired is for online pedagogy to be permeated with negative or "poisonous pedagogy," a phrase initially coined as *schwarze padagogik* by Katharina Rutschky (1977), that supposedly mirrors the real world because its antagonistic use by overzealous teaching staff "can have disastrous consequences for learners" in terms of emotional and psychological development (Lebow, 1995, p. 177).

Consequently, it would be of interest to educational researchers exploring online pedagogy to deepen their understanding by having a closer look at the methodology for supporting learning using instructional technology;

> *... which means identifying ways to help learners construct knowledge... Instruction is not instruction if it does not foster construction. Furthermore, if construction is what the learner does, then we need a different term for what a teacher (or other agent) does to foster construction, and 'instruction' has commonly been used more than any other term to convey that meaning. Therefore, we define instruction as anything that is done purposely to facilitate learning. It includes constructive methods and self-instruction, as well as more traditional views of instruction, such as lecture and direct instruction* (Reigeluth & Carr-Chellman, 2009, p. 6).

Contemporary educators might ask themselves what is their existing paradigm about online learning and teaching, and how does it manifest in a way that is measurable (Byrne, 2010). For example, the adoption of flexible learning and online teaching in higher education was researched at a regional Australian multi-campus university (Postle et al., 2003).

Their report revealed that research about a pedagogical framework for flexible learning and online teaching was "still in its formative years" though "there [was] a belief amongst some... that an online pedagogy, supported by appropriate online instructional design exists, but to date has not been articulated in any recognized, formal way" (Reushle, 2003, p. 9). "It remains, to those who believed that such a pedagogy exists…an elusive, but

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cherished prize that might solve the dilemmas and contradictions of online education" (Postle et al., 2003, p. 17).

As reasoned by Reushle and McDonald (2004), "the adoption of online technologies has meant that teachers are experiencing change in terms of their teaching philosophies, their relationships with learners and their work patterns and activities" (p. 6). Hence, it was recommended that teachers should consider shifting from passive to active learning, from environments that are teacher-centered to more learner-centered environments, and from decontextualized tasks to authentic, meaningful, and structured experiences (Reushle & McDonald, 2004).

Perhaps this is the kind of preorganization that most teachers covet when visualizing the anticipatory support mechanisms that build out capability, empower, and upskill when making the transition to flexible learning and online teaching because of the global COVID-19 pandemic? The construction of a framework for pedagogical values should be seen as a worthwhile attempt to investigate the journey from "foolishness to wisdom" and subsequently "how individuals learn from their life environments and become wiser than their earlier selves" (Simandan, 2013, p. 391).

2.2. An Educational Reboot

Since "transitioning from teaching in the traditional classroom to the online environment is not a simple task for most faculty, particularly veteran faculty who have taught in the traditional mode for eons" there exists a need for strategies to improve the whole experience while at the same time make it possible to continue the practice of good teaching whilst integrating with instructional technology (Grant & Thornton, 2007, p. 352). Such mediation should enable good judgment to "embrace innovation and develop strategies which simultaneously protect the integrity of preparation while acknowledging the need for change" (Keefe, 2020, p. 220).

Despite the unfamiliarity of such a neoteric intentional learning ecosystem that advocates new ideas, the reality is that in "every one of us is both a student and a teacher, [and] we are at our best when we each teach ourselves [and Socratically others] what we need to learn" (Johnson & Johnson, 1986, p. 14). Thus, perhaps the time has indeed come for a re-evaluation of the current paradigm for online pedagogy. As once remarked by Kuhn (1970), scientific advancement is not an evolutionary journey but is more like a "series of peaceful interludes punctuated by intellectually violent revolutions" in which one's "conceptual world view is replaced by another" (p. 6). The global COVID-19 pandemic has necessitated such a paradigm change.

2.3. Theoretical Rationale

Alongside effectiveness and efficiency, it is important to understand how engagement can increase learner interaction, interest, and satisfaction (Merrill, 2008; Merrill, 2009). Engagement can be defined as the quality of effort, in terms of time and energy, learners invest towards purposeful interactive involvement in educational activities and conditions that are likely to contribute directly to the construction of understanding (Coates, 2006; Kuh & Hu, 2001). In modern online courses, learners should be taking full responsibility for their learning, either as individuals or as participants in a CoI framework.

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On the one hand, the aim has always been to harness the potential afforded by communication and Internet technologies via "asynchronous interaction design options" that would enable participants to "maintain engagement in a community of learners when and where they choose" (Garrison & Cleveland-Innes, 2005, p. 133). On the other hand, the goal has also been to "structure the educational experience to achieve defined learning outcomes" using interaction that is scaffolded, systematic, critical, and reflective (Garrison & Cleveland-Innes, 2005, p. 134).

However, interaction alone is no guarantee and neither is it enough to facilitate cognitive presence in sustainable multimedia-enhanced intentional learning ecosystems although it is central to the "educational experience, whether it is online, face-to-face, or a blending of both" (Garrison & Cleveland-Innes, 2005, p. 134). Even if high levels of interaction may perhaps be reflective of group cohesion, "it does not directly create cognitive development or facilitate meaningful learning and understanding" (Garrison & Cleveland-Innes, 2005, p. 135). The underlying reason is that learners must attempt to learn by participating in the learning process, known as engagement theory (Kearsley & Shneiderman, 1999). The fundamental idea is that students must not be silent passive partners. Instead, they "must be meaningfully engaged in learning activities through interaction with others and worthwhile tasks" (Kearsley & Shneiderman, 1999, p. 1).

Analyzed closely, these are the achievable learning outcomes that Chickering and Gamson's (1987) *Seven Principles for Good Practice in Undergraduate Education (Seven Principles)* and Merrill's (2006) *Different Levels of Instructional Strategy (DLIS)* sought to harness. Such principles should be useful in letting "learners know what knowledge they are responsible for acquiring. Useful preorganizers... helps them to cognitively arrange and organize the knowledge before it is introduced" (Lever-Duffy et al., 2003, p. 50).

The end goal is to encourage them to construct their own understanding, or as stated by Scardamalia and Bereiter (2006) "All understandings are inventions; inventions are [thus] emergents" (p. 15). Succinctly, this was what the proposed Different Levels of Instructional Strategies (DLISt7) for Online Learning (Syaril Izwann, 2013) was designed to function as, "a set of workable principles that could guide pedagogy in a variety of contexts" (Scardamalia & Bereiter, 2006, p. 24).

3. Methodology

3.1. Statement of the Problem

The core idea of a previous study was to determine whether the Seven Principles could be revitalized by amalgamating them with DLIS (Syaril Izwann, 2013). The resultant standardized measure would then be proposed for use either as a rubric for facilitating the implementation of DLISt7 or as diagnostic "process indicators" (Kuh et al., 1997, p. 436). In other words, when DLIS is used as a rubric to stimulate responses from students, favorable online learning experiences consistent with the Seven Principles would be manifested (Syaril Izwann & Albion, 2016).

3.2. The Focus of the Research

A principle, as defined in the context of this study, is "a relationship that is always true under appropriate conditions regardless of the methods or models which implement this principle" and whose underlying function is "to promote more effective, efficient, or

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engaging learning" (Merrill, 2009, p. 43). In their original form, the Seven Principles were designed to be robust and simple to use (Chickering & Gamson, 1987). Upon being updated, the term "instructional strategy" was integrated to accentuate the utility of the Seven Principles in conjunction with "new communication and information technologies" (Chickering & Ehrmann, 1996, p. 1).

A review of related literature revealed that the Seven Principles were often implemented and assessed in their stand-alone forms instead of as a whole (Bangert, 2004; Bangert 2008; Batts, 2008; Chickering & Gamson, 1999; Cobbett, 2007; Wuensch et al., 2009). Perhaps the Seven Principles could be resuscitated by being analyzed from a different perspective. According to Merrill, "we need to back up and find out if there's a set of principles we can agree to and then build on these principles. Let's build on what's there instead of starting over and reinventing the wheel every single time" (Spector et al., 2005, p. 318).

In an attempt to use what was already there and not reinvent the wheel, the first author was prepared to follow a hunch based on correlations and logic by attaching DLIS as the component that introduces the science of utilizing instructional strategies (Cronbach, 1990; Syaril Izwann, 2013). The rationale was to move away from "information-only presentations" towards a more task-centered approach that increases in complexity to promote more effective, efficient, enduring and engaging learning (Merrill, 2006, p. 16).

3.3. Research Objective

The previous study aimed to develop, validate, and standardize a measure for assessing the effectiveness of online learning (Syaril Izwann, 2013). A measure is said to be standardized when; (a) its rules of measurement are clear, (b) it is practical to apply, (c) is not demanding of the administrator or respondent, and (d) its results do not depend upon the administrator (Netemeyer et al., 2003; Nunnally & Bernstein, 1994). Consequently, a measure that fulfils all the right criteria would yield "similar results across applications (i.e., the measure is reliable), and offer scores that can be easily interpreted as low, medium [or] high" (Netemeyer et al., 2003, p. 2). The secondary goal was to determine the validity of DLISt7 as a conceptual framework and the reliability of the items.

3.4. Methods

Initially, the proposed methodology was of a follow-up sample web survey (Tuckman, 1999). However, such a survey would suffer "from the absence of a designed comparison" (Tuckman, 1999, p. 11) because only "a static snapshot" would be captured (Gustafsson, 2010, p. 82).

Since a true experiment was not possible, a quasi-experimental design was applied. Consequently, the web survey evolved into a non-equivalent pretest-posttest control group Internet quasi-experiment that "provide[d] substantially better control of the threats to validity than do pre-experimental designs" (Tuckman, 1999, p. 167) and may be used "where better designs are not feasible" (Campbell & Stanley, 1963, p. 204) because the "conditions complicate or prevent complete experimental control" (Tuckman, 1999, p. 168).

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It was also assumed that DLISt7 as a "treatment [was] included by selection rather than manipulation" (Tuckman, 1999, p. 181), and because of its inherent qualities could also be used as an unobtrusive measure that did not "require acceptance or awareness by the experimental subjects" (Tuckman & Harper, 2012, p. 126).

3.4.1. Research Sampling

Sample members were drawn using a three-stage purposive cluster sampling technique (Ary et al., 2010; Cochran, 1977; Johnson & Christensen, 2008). The whole process took sixteen months to complete beginning in late November 2009. Full ethics clearance was granted by the Human Research Ethics Committee (HREC) (H10REA016) (Syaril Izwann, 2013).

In light of this research being conducted over the Internet, it also qualifies as a field experiment because of the real-life setting (Christensen, 1997, p. 93). Moreover, there are also the value-added advantages of speed, low cost, external validity, experimenting around the clock, a high degree of automation (i.e., low maintenance, limited experimenter effects), and a wider sample (Reips, 2002, p. 244). Thus, the design of this study was able to make good use of the advantages offered by Internet [field] experiments (Johnson & Christensen, 2012). The design should also be adequate to permit others to retest the research instrument when contemplating how to reimagine educational practices resourcefully because of the global COVID-19 endemic.

3.4.2. Reliability Analysis

In psychometric literature, there are two broad types of reliability "(a) test-retest (temporal stability) and (b) internal consistency: the inter-relatedness among items or sets of items in a scale" (Netemeyer et al., 2003, p. 10). Cronbach's alpha reliability analysis ascertains internal consistency or the extent to which the items in an instrument are convergent (Pallant, 2007). This is to answer the "simple question, [to which] there are legitimate disagreements about the correct answer," the issue of "how are such measures developed and validated" in relation to construct validity (Nunnally & Bernstein, 1994, p. 86). Accordingly, by using alpha coefficients from both the pilot and main study, the researcher was able to establish that the groups were about the same in most characteristics (McMillan & Schumacher, 2009) and that the temporal stability of the research instrument was excellent (George & Mallery, 2011). No items were identified to be problematic requiring exclusion from the measure (Coakes & Ong, 2011).

4. Result

Previous publications have reported all details of the original study (Syaril Izwann, 2013; Syaril Izwann & Albion, 2016). In this paper, the focus is on the conceptual validation by factor analysis to promote the use of DLISt7 as a toolkit for educators coming to terms with or transitioning to flexible learning and online teaching in response to the global COVID-19 fallout.

4.1. Factor Analysis

Exploratory and confirmatory factor analysis was conducted to validate the constructs that constitute the conceptual framework of DLISt7. A sample size (*N*) of 283 participants, which is a ratio of 7.45:1 satisfactorily meets the desired case-to-variables ratio for

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Principal Component Analysis (PCA) (Gorsuch, 1983; Hatcher, 2007). In an attempt to identify simple structure, the 38 items that constitute DLISt7 were subjected to both Principal Factor Analysis (PFA) and Generalized Least Squares (GLS) extraction with rotation. Inspection of the correlation matrix for both extraction methods revealed relatively similar correlations above 0.3 which meant that the two matrices were suitable for factoring.

The Kaiser-Meyer-Olkin's measure (KMO = 0.93) were both identical and marvelous (George & Mallery, 2011). Similarly, Bartlett's Test of Sphericity were the same and significant ($\chi^2 = 5955.068$, $p < 0.001$) suggesting that the two correlational matrices were not identity matrices and further analysis would be appropriate (Pett et al., 2003). Inspection of the anti-image correlation matrices revealed that Measures of Sampling Adequacy (MSA) along the diagonal for both extractions were similar and well above 0.5 (Coakes & Ong, 2011).

Communalities (h^2) for individual items were across the board greater than 0.30 except for Item 1.3 which had for PFA ($h^2 = 0.295$) and GLS ($h^2 = 0.279$) (Pallant, 2007). Nevertheless, these values were still greater than 0.25 which meant that the factor model was working well enough with no items requiring exclusion (Garson, 2012).

Total variance explained for both extractions indicated that there were seven factors (f) with eigenvalues greater than 1. The variance explained for PFA (53.25%) was comparable to GLS (53.20%). Both extractions produced identical f numbers which were confirmed using Cattell's scree test.

Additionally, Watkins' Monte Carlo PCA for parallel analysis was also used to compare corresponding criterion values from a randomly generated data matrix of the same size (38 variables x 283 participants). Again, seven factors that did not exceed the eigenvalues of the original extractions were revealed (Pallant, 2007).

An analysis of the f matrices indicated that seven factors were extracted in 10 iterations for PFA and 11 iterations for GLS. Item dimensionality for the two extractions was good with no items requiring exclusion because of loadings less than 0.40 (Brace et al., 2009). The rotated factor (f') matrix for PFA revealed that for the 38 items used, 17 variables were loading greater than 0.3 purely on one factor, and 21 complex variables were loading on more than one factor (Coakes et al., 2008).

Oblique rotation was performed to confirm the interpretation of the f model. The goodness of fit test for GLS, was significant, χ^2 (458, N = 283) = 869.44, $p < 0.001$, $w = 1.75$ (large effect) suggesting that the model does not fit the data well (Albright & Park, 2009). This validates the earlier yield obtained from total variance explained in which an eighth construct missed the cut with eigenvalues of 0.939 for both PFA and GLS extractions.

Interpretation of the GLS pattern matrix (P_{vf}) revealed 29 pure main loadings with 1 item read as an overlap, 12 as excellent, 8 as very good, 5 as good, 2 as fair and 1 as poor (Comrey & Lee, 1992). As for the 8 complex cross-loadings, 1 was recognized as very good, 3 as good, and 4 as fair. However, item 3.5 was suppressed (Field, 2009).

In the search for simple structure, findings from the GLS structure matrix (S_{vf}) were used to double-check and thereafter revise the research instrument (Field, 2009). No oblique factor loadings less than 0.30 were used to define factors (Comrey & Lee, 1992).

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The factor correlation matrix (R_{ff}) indicated relationships ranging from slight, almost negligible (0.12) to moderate (0.58) correlations (Coakes & Ong, 2011). Thus, orthogonality and construct validity of the discriminate variety can be safely assumed (Brown, 2006; Garson, 2012).

As for the internal consistency of the model, due process and the integration of evidence about the "appropriateness of [the] content, correlations with external variables, and hypotheses about constructs" (Cronbach, 1990, p. 707) has revealed evidence that the conceptual framework known as DLISt7 is discriminate by nature (Brown, 2006).

4.2. Summary of Results

After successfully developing and validating DLISt7 as a conceptual framework that can measure observable phenomena, the first author was able to systematically answer his research questions. Firstly, of the eight principles specified, seven loaded successfully. Secondly, the factor loadings indicated that the items utilized are measuring the appropriate constructs, and were thus reliably tapping into what was supposed to be measured.

5. Discussion

The authors are optimistic that by successfully developing a correlated measuring procedure that is not only psychometrically reliable in terms of development, validation, and standardization (Cronbach, 1990; Netemeyer et al., 2003; Nunnally & Bernstein, 1994), but constructed to function either as a rubric or as unobtrusive diagnostic indicators of process, this study would be able to make a useful contribution to existing bodies of knowledge in terms of refuting the criticisms that had been levelled at other studies from a similar vein.

Firstly, Bangert (2008) argues that a major limitation of studies related to the discovery of principles involved in instructional strategies, and their subsequent use to invent instructional design procedures and tools to promote learning, was their "failure to use or develop psychometrically sound instruments" (p. 27). Similarly, Vandewaetere and Desmet (2009), also argued that a "great majority of questionnaires measuring non-observable constructs such as attitude towards CALL [Computer Aided Language Learning] are often developed from a specific point of view and were seldom followed by psychometrical validation" (p. 349). That was why the "psychometrical properties of the questionnaire, such as construct validity and reliability" are often left unanswered (Vandewaetere & Desmet, 2009, p. 349).

Secondly, Scardamalia and Bereiter (2006) contend that principles are often "framed as goals, rules, beliefs, design parameters, or diagnostic questions" that are "too abstract" to be of any use (p. 24). Thirdly, Achtemeier et al. (2003) are of the opinion that principles and inventories seem to include whatever someone decides is appropriate to ask at that point in time.

Last but not least, it should be realized that both DLIS and the Seven Principles "tell us the things that most [good] instructors already know" (Hutchins, 2003, p. 8). The mistake that should not be repeated is to interpret the former and latter or DLISt7 "as a grand meta-principle" (Cross, 2005, p. 1). Students will still need to work their way through the pathways of knowledge to find answers. The sharing of metacognition about "what the

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experts know is not likely to result in the kind of deeper learning that we want to encourage" but what is important is to generate awareness about DLISt7 so that others will "know what to look for" in terms of the difference between planned occurrences of instructional strategies as opposed to random acts (Cross, 2005, p. 1).

6. Conclusion

According to Gomis et al., (2022) "The global COVID pandemic has exacerbated the challenges related to teaching and learning" (p. 2). "During the coronavirus pandemic of 2020, teachers and educators across the [globe] have been forced to move instruction online suddenly, confirming the need for progressive approaches to maintain the integrity of teacher preparation and to acknowledge the need for future educators' digital teaching competence" (Keefe, 2020, p. 223). Although the proliferation of the PC and the Internet has been without a doubt an important influence on our daily work patterns and life balance activities, their success as an information age learning and teaching approach remains partial because many of the guiding principles for integrating instructional technology with good pedagogy are inapt (Scardamalia & Bereiter, 2006).

Despite looking good on paper, most sets of guiding principles are difficult to assess for effectiveness and real-world utility because the principles do not facilitate the development of *self-efficacy*, that is, belief about being prepared to "meet the demands of a task" (Snowman et al., 2012, p. 131). Consequently, this study attempted to harmonize with the law of parsimony because;

> *…a theory should be stated in the simplest form that adequately explains the phenomena. This does not mean that all theories should be simple statements; rather, they should be stated succinctly and precisely, avoiding ambiguities and unnecessary complexity. Important factors must not be overlooked, and the comprehensiveness of the theory must be adequate for its purpose* (Wiersma & Jurs, 2009, p. 21).

"One legacy of the COVID-19 pandemic should be increased efforts to not only prepare teachers to meet the current demands but also a recognition of the importance of creating a teacher workforce that is prepared to support students in blended and online environments" (Borup et al., 2020, p. 168). Potentially, this could be the substantiation needed to justify why learners and educators alike should be aware of pedagogical values such as the Seven Principles, DLIS, and the CoI model. However, without mediating the different pedagogical principles into a framework that is simple, clear, practical, not demanding, and standardized, as is the case with DLISt7, it would remain a conceptual challenge to effectively assimilate instructional technology with good pedagogy (Syaril Izwann & Albion, 2016).

Consequently, to better understand one's responsibilities as a teacher who had to move instruction online because of the global COVID-19 pandemic, we can no longer beat around the bush that "transition[ing] to the online environment can be especially difficult [since] many [of us] are currently learning how to teach online… [and are a bit anxious about] the types of support most likely to promote student success" (Borup et al., 2020, p. 162). Thus, in the search for an answer to the question of "how wisdom contributes to decision making" we could compare and contrast two possible meanings for the word (Webb, 2018, p. 4). According to Staudinger (2008), one the one hand "wisdom is knowledge about the human condition at its frontier… about the most difficult questions

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of the meaning and conduct of life… about the uncertainties …, about what cannot be known, and how to deal with that limited knowledge" (p. 108). On the other hand, The Oxford Dictionary of 1933 (Staudinger, 2008) defines wisdom as 'good judgment and advice in difficult and uncertain matters'. DLISt7 has been demonstrated to be conceptually robust and would be a useful addition to the toolkit of educators seeking to be effective in coming to terms with or transitioning to online education as required in response to the global COVID-19 endemic.

Ethics Approval and Consent to Participate

The researcher utilized the research ethics clearance (H10REA016) provided by the Human Research Ethics Committee (HREC) at the University of Southern Queensland (USQ), Darling Downs, Toowoomba, Australia. All procedures performed in this study involving human participants were included by selection rather than manipulation in accordance with the ethical standards of the institutional research committee. Informed consent was obtained from all participants according to the Declaration of Helsinki.

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Conflict of Interests

The author reported no conflicts of interest for this work and declare that there is no potential conflict of interest with respect to the research, authorship, or publication of this article.

References

Achtemeier, S. D., Morris, L. V., & Finnegan, C. L. (2003). Considerations for developing evaluations of online courses. *Journal of Asynchronous Learning Network, 7*(1): 1-13. https://doi.org/10.24059/olj.v7i1.1859/.

Albright, J. J., & Park, H. M. (2006 - 2009, April 2009). Confirmatory factor analysis using Amos, LISREL, Mplus, SAS/STAT CALIS*. *Working Paper.* http://www.indiana.edu/~statmath/stat/all/cfa/index.html/.

Anderson, T. & Dron, J. (2011). Three generations of distance education pedagogy. *The International Review of Research in Open and Distance Learning, 12* (3). https://doi.org/10.19173/irrodl.v12i3.890/.

Ary, D., Jacobs, L. C. & Sorenson, C. (2010). *Introduction to research in education* (8th ed.). Wadsworth.

Bangert, A. W. (2004). The seven principles of good practice: A framework for evaluating online teaching. *The Internet and Higher Education, 7*(3): 217-232. https://doi.org/10.1016/j.iheduc.2004.06.003/.

© 2022 by the authors. Published by Secholian Publication. This article is licensed under a Creative Commons Attribution 4.0 International License (CC BY).

Bangert, A. W. (2008). The development and validation of the student evaluation of online teaching effectiveness. *Computers in the Schools, 25*(1): 25-47. https://doi.org/10.1080/07380560802157717/.

Batts, D. (2008). Comparison of student and instructor perceptions of best practices in online technology courses. *MERLOT Journal of Online Learning and Teaching, 4*(4). http://jolt.merlot.org/vol4no4/batts_1208.htm/.

Borup, J., Jensen, M., Archambault, L., Short, C. R., & Graham, C. R. (2020). Supporting students during COVID-19: Developing and leveraging academic communities of engagement in a time of crisis. *Journal of Technology and Teacher Education 28*(2), 161-169. https://www.learntechlib.org/primary/p/216288/.

Brace, N., Kemp, R., & Snelgar, R. (2009). *SPSS for psychologists* (4th ed.). Palgrave Macmillan.

Brown, T., A. (2006). *Confirmatory factor analysis for applied research*. The Guildford Press.

Byrne, B. M. (2010). *Structural equation modeling with AMOS: Basic concepts, applications, and programming* (2nd ed.). Routledge.

Campbell, D. T. & Stanley, J. C. (1963). *Experimental and quasi-experimental designs for research (on teaching).* Houghton Mifflin Company.

Chickering, A. W., & Gamson, Z. F. (1987). *Seven principles for good practice in undergraduate education.* American Association for Higher Education (AAHE) Bulletin. https://eric.ed.gov/?id=ED282491/.

Chickering, A. W., & Ehrmann, S. C. (1996). *Implementing the seven principles: Technology as a lever*. https://www.researchgate.net/publication/246430027_Implementing_the_Seven_Principles_Technology_as_Lever/.

Chickering, A. W. & Gamson, Z. F. (1999). Development and adaptations of the seven principles for good practice in undergraduate education. *New Directions for Teaching and Learning,* 80: 75-81. https://doi.org/10.1002/tl.8006

Christensen, L. B. (1997). *Experimental methodology* (7th ed.). Allyn & Bacon.

Coakes, S. J., Steed, L., & Price, J. (2008). *SPSS: Analysis without anguish; version 15.0 for Windows.* John Wiley & Sons.

Coakes, S. J. & Ong, C. (2011). *SPSS: Analysis without anguish; version 18.0 for Windows.* John Wiley & Sons.

Coates, H. (2006). *Student engagement in campus-based and online education*. Routledge.

Cobbett, S. (2007). A Re-conceptualized model of good online pedagogical practices. In Bastiaens, T. & Carliner, S. (Eds.) *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2007* (pp. 2410-2415) by the Association for the Advancement of Computing in Education (AACE). http://www.editlib.org/f/26718/.

Cochran, G. W. (1977). *Sampling techniques*. (3rd ed.). John Wiley & Sons.

Comrey, A. L., & Lee, H. B. (1992). *A first course in factor analysis.* Lawrence Erlbaum.

Cronbach, L. J. (1990). *Essential of psychological testing*. Harper & Row.

Cross, K. P. (2005) What do we know about students' learning and how do we know it? *Research & Occasional Paper Series: Center for Studies in Higher Education (CSHE), 7*(5): 1-13. https://www.westminster-mo.edu/academics/assessment/Documents/studentlearning.pdf/.

Driscoll, M. (2020, 11 June). Taylor's takes private university top spot. *The Star, Nation,* p. 4.

Field, A. (2009). *Discovering statistics using SPSS* (3rd Ed.). Sage Publication.

© 2022 by the authors. Published by Secholian Publication. This article is licensed under a Creative Commons Attribution 4.0 International License (CC BY).

Garson, D. G. (1996-2012). *Factor analysis: Statnotes from North Carolina State University, Public Administration Program.* http://faculty.chass.ncsu.edu/garson/PA765/garson.htm/.

Garrison, D. R., & Cleveland-Innes, M. (2005). Facilitating cognitive presence in online learning: Interaction is not enough. *American Journal of Distance Education, 19*(3), 133-148. https://doi.org/10.1207/s15389286ajde1903_2/.

Garrison, D. R., Cleveland-Innes, M., & Tak, F. S. (2010). Exploring causal relationships among teaching, cognitive and social presence: Student perceptions of the community of inquiry framework. *The Internet and Higher Education, 13*(1-2), 31-36. https://doi.org/10.1016/j.iheduc.2009.10.002

George, D., & Mallery, P. (2011). *SPSS for Windows step by step: A simple guide and reference 18.0 update* (11th ed.). Allyn & Bacon.

Gomis, K., Saini, M., Pathirage, C., & Arif, M. (2022). Enhancing quality of teaching in the built environment higher education, UK. *Quality Assurance in Education*. https://doi.org/10.1108/qae-03-2022-0072

Gorsuch, R. L. (1983). *Factor analysis* (2nd ed.). Lawrence Erlbaum Associates.

Grant, M. R., & Thronton, H. R. (2007). Best practices in undergraduate adult-centered online learning: Mechanisms for course design and delivery. *MERLOT Journal of Online Learning and Teaching, 3*(4), 346-356. https://jolt.merlot.org/documents/grant.pdf/.

Gustafsson, J.-E. (2010). Longitudinal designs. In Creemers, B. P. M., Kyriakides, L. & Sammons, P. (Eds.), *Methodological Advances in Educational Effectiveness Research* (pp. 77-101). Routledge**.**

Hatcher, L. (2007). *A step-by-step approach to using SAS for factor analysis and structural equation modelling* (9th Ed.). SAS Publishing.

Haughton, N. A., & Romero, L. (2009) The online educator: Instructional strategies for effective practice. *MERLOT Journal of Online Learning and Teaching, 5*(3): 570-576. https://jolt.merlot.org/vol5no3/haughton_0909.htm/.

Hutchins, H. M. (2003). Instructional immediacy and the seven principles: Strategies for facilitating online courses. *Online Journal of Distance Learning Administration, VI* (III): 11. https://www.westga.edu/~distance/ojdla/fall63/hutchins63.html/.

Johnson, B., & Christensen, L. (2008). *Educational research: Quantitative, qualitative and mixed approaches* (3rd ed.). Sage Publications.

Johnson, B., & L. Christensen, L. (2012). *Educational research: Quantitative, qualitative and mixed approaches* (4th ed.). Sage Publications.

Johnson, S., & Johnson, C. (1986). *The one minute teacher; How to teach others to teach themselves*. Quill.

Kearsley, G., & Shneiderman, B. (1999). Engagement theory: A framework for technology-based learning and teaching. 1-6. http://home.sprynet.com/~gkearsley/engage.htm/.

Keefe, E. S. (2020). Learning to practice digitally: Advancing preservice teachers' preparation via virtual teaching and coaching. *Journal of Technology and Teacher Education 28*(2), 223-232. https://www.learntechlib.org/primary/p/216145/.

Kuh, G. D., Pace, C. R., & Vesper, N. (1997). The development of process indicators to estimate student gains associated with good practices in undergraduate education. *Research in Higher Education, 38*(4), 435-454. https://doi.org/10.1023/A:1024962526492

Kuh, G. D., & Hu, S. (2001). The effects of student-faculty interaction in the 1990s. *The Review of Higher Education, 24*(3), 309-332. https://doi.org/10.1353/rhe.2001.0005

© 2022 by the authors. Published by Secholian Publication. This article is licensed under a Creative Commons Attribution 4.0 International License (CC BY).

Kuhn, T. S. (1970). *The structure of scientific revolutions* (2nd ed.). University of Chicago Press.

Lebow, D. (1995). Constructivist Values for Instructional Systems Design: Five Principles Toward a New Mindset. In B. B. Seels (Ed.), *Instructional design fundamentals: A reconsideration* (pp. 175-187). Educational Technology Publications.

Lever-Duffy, J., McDonald, J. B., & Mizell, A. P. (2003). *Teaching and learning with technology.* Pearson Education.

Lever-Duffy, J., McDonald, J. B., & Mizell, A. P. (2005). *Teaching and learning with technology* (2nd ed.). Pearson Education.

McMillan, J. H., & Schumacher, S. (2009). *Research in education: Evidence-based inquiry* (7th ed.). Prentice-Hall.

Merrill, M. D. (2006). *Hypothesized performance on complex tasks as a function of scaled instructional strategies*. 1-33. https://mdavidmerrill.wordpress.com/publications/first-principles-of-instruction/.

Merrill, M. D. (2008). What makes e3 (effective, efficient, engaging) instruction? *Paper presented at the Association for Education Communication and Technology (AECT) Research Symposium.* www.aect.org/events/symposia/Docs/Merrill_paper.doc

Merrill, M. D. (2009). First principles of instruction. In Reigeluth, C.M. & Carr-Chellham, A. A. (Eds.), *Instructional Design Theories and Models; Building a Common Knowledge Base* (Vol. III, pp. 41-56). Routledge. https://mdavidmerrill.files.wordpress.com/2019/07/firstprinciplesreigeluthcarr-1.pdf/.

Moore, R. (2004). *Education and society: Issues and explanations in the sociology of education.* Polity Press.

Myers, D. G. (2015). *Exploring social psychology (*7th ed.). McGraw-Hill Education.

Netemeyer, R. G., Beardon, W. O., & Sharma, S. (2003). *Scaling procedures: Issues and applications*. Sage Publications.

Ngeow, Y. M. (2020, June 9). The gains and pains of e-learning. *The Star, Starspecial, Higher Education,* p. 5*.*

Nora Manaf. (2020, July 23). Rising to the new normal; How a pandemic challenged our comfort zone. *The Star, StarBiz, Insight,* p. 4.

Nunnally, J. C. & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). McGraw-Hill.

O'Keefe, L., Rafferty, J., Gunder, A., Vignare, K. (2020, May 18). Delivering high-quality instruction online in response to COVID-19: Faculty playbook. Every learner everywhere. https://eric.ed.gov/?id=ED605351

Pallant, J. (2007). *SPSS Survival manual: a step by step guide to data analysis using SPSS for Windows* (3rd ed.). Open University Press.

Pett, M. A., Lackey, N. R., & Sullivan, J. J. (2003). *Making sense of factor analysis: The use of factor analysis for instrument development in health care research.* Sage Publications.

Postle, G., Sturman, A., Cronk, P., Mangubhai, F., Carmichael, A., McDonald, J., Reushle, S., Richardson, L., & Vickery, B. (2003). *Online Teaching and Learning in Higher Education: A Case Study.* EIP Project Report, DEST.

Reigeluth, C. M., & Carr-Chellman, A. A. (Ed.) (2009). *Understanding instructional theory* (Vol. III). Routledge.

Reips, U.-D. (2002). Standards for internet-based experimenting. *Experimental Psychology, 49*(4): 243-256. https://doi.org/10.1026//1618-3169.49.4.243

Reushle, S. (2003). *Professionally developing adults to teach in online environments: A transformative approach.* Unpublished Dissertation Research Proposal. USQ.

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Reushle, S., & McDonald, J. (2004). *Online learning: Transcending the physical* Paper presented at the Effective Teaching and Learning Conference: A Conference for University Teachers. http://eprints.usq.edu.au/4368/

Scardamalia, M., & C. Bereiter. (2006). Knowledge building: Theory, pedagogy, and technology. In K. Sawyer (Ed.), *Cambridge Handbook of the Learning Sciences* (pp. 97-118). Cambridge University Press. https://doi.org/10.1017/CBO9780511816833.008

Staudinger, U. M. (2008). A psychology of wisdom: History and recent developments. *Journal of Research in Human Development. 5*(2): 107-120. https://doi.org/10.1080/15427600802034835

Shea, P., Hayes, S., Smith, S. U., Vickers, J., Bidjerano, T., Pickett, A., Gozza-Cohen, M., Wilde, J., & Jian, S. (2012). Learning presence: Additional research on a new conceptual element within the Community of Inquiry (CoI) framework. *The Internet and Higher Education,* 2012, *15*(2):89-95. https://doi.org/10.1016/j.iheduc.2011.08.002

Shneiderman, B. (1998). Relate-Create-Donate: a teaching/learning philosophy for the cyber-generation. *Computers & Education, 31*, 25-39. https://doi.org/10.1016/S0360-1315(98)00014-1

Simandan, D. (2013). Learning wisdom through geographical dislocations. *The Professional Geographer, 65*(3), 390-395. https://doi.org/10.1080/00330124.2012.693876

Skinner, B. F. (1938). *The behavior of organisms: An experimental analysis*. Appleton-Century-Crofts.

Skinner, B. F. (1968). *The technology of teaching*. Englewood Cliffs, Prentice-Hall.

Snowman, J., McCown, R., & Biehler, R., (2012). *Psychology applied to teaching.* Wadsworth Cengage Learning.

Spector, J. M., Ohradza, C., Van Schaack, A., & Wiley, D. A. (2005). *Innovations in instructional technology; Essays in honor of M. David Merril.* Lawrence Erlbaum Associates.

Syaril Izwann Jabar. (2007). *Student Perception Towards the Effectiveness of Instructional Strategies for Online Learning in Sultan Idris University of Education (UPSI).* Unpublished M.Ed dissertation. UPSI.

Syaril Izwann Jabar. (2013). *Assessing the Effectiveness of the Different Levels of Instructional Strategies (DLISt7) for Online Learning by Undergraduate Students at the University of Southern Queensland (USQ), Australia*. Doctoral dissertation. http://eprints.usq.edu.au/view/creators/Jabar=3ASyaril_Izwann=3A=3A.html

Syaril Izwann Jabar, & Albion, P. R. (2016, June). Assessing the Reliability of Merging Chickering & Gamson's Seven Principles for Good Practice with Merrill's Different Levels of Instructional Strategy (DLISt7). *Online Learning Special Issue: Learning Analytics, 20*(4), 51-74 https://onlinelearningconsortium.org/read/journal-issues/

Tuckman, B. W. (1999). *Conducting educational research* (5th ed.). Harcourt Brace College Publishers.

Tuckman, B. W., & Harper, B. E. (2012). *Conducting educational research* (6th ed.). Rowman & Littlefield Publishers.

Vandewaetere, M., & Desmet, P. (2009). Introducing psychometrical validation of questionnaires in CALL research: The case of measuring attitude towards CALL. *Computer Assisted Language Learning, 22*(4): 349-380. https://doi.org/10.1080/09588220903186547

Webb, P. J. (2018). Coaching for wisdom. In K. Brush & I. Sobolewska (Eds.), *European Mentoring & Coaching Council (EMCC) 8th International Mentoring, Coaching and Supervision Research Conference* (pp. 2-13). University of Chester. https://www.academia.edu/40822779/COACHING_FOR_WISDOM

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Wiersma, W., & Jurs, S. G. (2009). *Research methods in education: An introduction* (9th ed.). Allyn & Bacon.

Wuensch, K. L., Shahnaz, A., Ozan, E., Kishore, M., & Tabrizi M. H. N. (2009). Technology and pedagogy: The association between students' perceptions of the quality of online courses and the technologies employed. *MERLOT Journal of Online Learning and Teaching, 5*(2): 253-262. https://jolt.merlot.org/vol5no2/wuensch_0609.htm/.

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