Title	Editorial: From pandemic to endemic: Why evidence-informed practices are more important than ever?
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Editorial

From Pandemic to Endemic: Why evidence-informed practices are more important than ever?

The Covid-19 pandemic has undoubtedly created major shifts in human existence today. Norms of living, ways of interaction and the process of just *being* and *becoming* differ dramatically now, compared to pre-pandemic days. Circa January 2020 when the first news of corona virus cases was broken to the world, we anticipated it to be akin to Severe Acute Respiratory Syndrome disease (SARS). With a bountiful of experience and lessons derived from SARS almost a decade ago, the world is perceivably more than capable, to nip corona in the bud and reign in its spread.

Yet today, numerous nations around the world are still dealing with the Corona battle. As educators and Learning Scientists, one of the more prevalent questions asked of us, is, how will this pandemic affect Learning? As we move to a new normal endemic, what are the changes in teaching and learning that can be expected? In the recent two years preceding today, the National Institute of Education, Singapore, has been advancing an initiative called the 'Science of Learning' (SoL) in education. SoL is fundamentally about integrating evidence from scientific findings into education. Specifically, the Science of Learning in Education (SoLE) is a nascent field seeking to identify, investigate and cohere scientific findings, across multi-disciplines, and to validly test and trial the science for translation into education. Through scientifically validated interventions and pedagogical innovations, the aim is not only to study the way people learn and how they learn differently but to also provide good scientific explanations for why some learning strategies work better for some, while worse for others. It is envisaged that education's "grand challenges" can be optimally addressed through scientifically validated evidence. For example, what are the best ways to maximize the quality of life – do we need a combination of good cognitive and socio-emotional development coupled with optimal lifestyles such as sufficient sleep, diet and exercise? What kinds of social interactions catalyze learning and what do they do to our major learning organ, the brain? What do we know about the best regulatory mechanisms for learning and how they impact different learners? What conditions facilitate the effectiveness of learning activities, in different group sizes?

It is with the end goals of addressing "grand challenges" in education that we reiterate the core purpose of *Learning: Research and Practice*. In advancing empirically supported learning theorizations, we support distinct and progressive research that responds to the problems of current educational practices, that is importantly, grounded in empirically supported investigations of learning processes and outcomes.

We have seen a large avalanche of information surge arising from the COVID-19 pandemic, presented to healthcare and policymakers regarding the deadly disease. From injecting disinfectant to purportedly abolish the virus, debating side-effects of vaccines and its efficacies, to skepticism towards contact-tracing apps allegedly related to Cambridge Analytica. Yet what has differentiated successful national models of handling the pandemic are stakeholders who can collate, critically review, appraise and swiftly act on the appropriate information to mitigate its

deadliness on mankind. The speed of the pandemic is a threat to traditional models of knowledge translation and practice change. What is clear, there is a critical need for stakeholders to be agile in their thinking and adaptive in their practice in order to find the optimal pivots of change.

In the face of social media challenges and the rampant spread of unauthenticated information, adoption of new methods should be based on clear, clinical judgement, the weight of evidence and the balance of probabilities that any new technique, test or treatment might work. The pandemic requires all of us to reach a new level of evidence-informed practices characterized by criticality, skepticism, thoughtfulness, responsiveness and agility in practice (Carley, Horner, Body & Mackway-Jones, 2020). And this is what we envisage the trajectory of current and future teaching and learning will entail – it requires education stakeholders, teachers and students who are able to exercise critical thinking and agile adaptivity in the face of whirlwind changes in learning contexts.

It is no longer viable to perpetuate pedagogical practices that 'do not work' – for example, the entrenched belief in learning styles (Newton & Miah, 2017) are myths that have been debunked. Instead, teaching and learning based on scientific evidence is key to developing the competencies we know will be crucial for young people to thrive in a changing world. Technologies have made the traditional model of teaching obsolete, where teachers are keepers of knowledge and uniformly provide content to students. The nature of the teaching profession has changed. Now, teachers must *apply* their pedagogical knowledge to foster skills that meet the demands and expectations of the milieu, including embracing learner differences, individual learning variations, and the multiple possible pathways for learning that disrupt traditional categorizations of learners by age and stage.

Different approaches that focus on why and how certain learning strategies work better for what type of learners, mean getting at the core of evidence-informed teaching practices. In this issue of Learning Research and Practice, we present four articles that speak to the 'core' of evidence-informed practices. Methodologically, two articles in this issue employed a systematic review method to synthesize the accumulated research evidence on practice-oriented topics. The other two articles provide evidence-informed practices drawn from classroom-based research.

The issue begins with the article by Koivuniemi, Järvenoja, Järvelä, and Thomas that provides a comprehensive review of the psychological instruments that measure and support students' self-regulated learning in school contexts. Self-regulated learning (SRL) is a topic that has generated great interest among researchers and practitioners since it is a core ability that learners of all ages and in all disciplines need to develop (Paris & Paris, 2001). Despite its importance, many teachers remain unclear about how to assess and support SRL, needing more translated knowledge informed by research evidence. The authors acknowledge the complex nature of SRL where the different cognitive, motivational, and emotional aspects of learning are interrelated. Further, they hold the view *Assessment for Learning* that assessment information should inform practices to help students improve their learning process and outcomes. Their comprehensive review of 161 SRL instruments revealed that while many instruments focus on measuring cognitive aspects of SRL, fewer instruments exist to support motivational and emotional aspects

of SRL. The article calls for more research that can inform how to measure and support students' SRL in different phases, helping students "becoming" more regulated as they develop new competencies.

The next article by Jerez, Orsini, Ortiz & Hasbun continues to provide evidence-informed practices through a systematic review of studies concerning how to support large-group activities in higher education settings. While large-group classes are a reality for many higher education institutions, little is known about under what conditions large-group activities can be more effective. Class size has been a long-lasting issue in educational research. While reducing class sizes appears a straightforward solution, many questions surrounding the class size issue remain uncertain, such as how large is large, whether there is an optimal size of a class, and whether small classes are always better than large classes. Of course, asking these questions reflects the naïve assumption about the relationship between class sizes and learning outcomes. Class size alone is not a deterministic factor since a classroom is a nest of "blooming, buzzing confusion" (Brown, 1992, p.141). The authors argue that we need to go beyond criticizing large classes and to find ways to support large-group activities as this is the reality of many universities. Through a systematic review of 78 relevant articles, this study identified five inter-related factors that facilitate effective large-group learning activities: interactions, active teaching and learning methods, classroom management, student motivation and engagement, and use of online teaching resources. These five factors are framed from the constructivist pedagogical perspective, suggesting the need to make a shift from instructor-centric approaches to more interactive and learner-centric approaches in large-sized classes.

A core aspect of critical competencies is its accompanying inquiry disposition that can be nurtured through the skill of questioning. Shinogoya's study explored the effects of question generation instructions on students' attitudes towards question generation and strategy use. Comparing students in the "instruction group" where students were instructed on how to develop questions during lecture preparation to better understand the upcoming lecture and those in the "connecting group", where in addition to instruction, the questions students generated during preparation were linked to lecture content, the study found that instruction significantly decreases students' perception of difficulty regarding question generation and increases learning outside the classroom. It is also highlighted that connecting questions to lecture content increased students' use of micro-understanding focused strategies and increased positive attitudes towards question generation. Empirical evidence from Shinogoya's study is important to guide us towards validated operationalization of how questioning strategies can be scaffolded in education environments.

Extending the empirical orientation, the final paper in this issue looks at the important role of metacognition in learning and its interrelation with academic achievements. Taking a holistic perspective to student development, the study articulates how mindfulness has been shown to enhance metacognition and subsequent outcomes such as mental health. While mindfulness has been investigated in relation to enhancing outcomes in education, less consideration has been given to the scientific evidence of the role of metacognition as a mediating factor. Using a between-groups design to investigate whether a mindfulness intervention significantly improves

learning outcomes, and whether the relationship between mindfulness and learning outcomes is mediated by metacognition, this study represents an important step in terms of investigating mechanisms of change through evidence-informed educational practices

Taken together, it is hoped that these articles would open up further conversations around the importance of harnessing validated evidence to inform our teaching and learning practices. In elucidating the translations between scientific findings and education applications, we hope that this issue catalyzes our resolve to advance education that is best served and strengthened when an evidence-informed perspective is taken to deeply understand tenets of learning and how best to design learning towards maximizing every learner's potential for optimal outcomes. We welcome any articles that extend work in these areas, or commentary that seek further dialogue to discuss how we, as a community, can further propel the use of educational evidence to address the grand challenges we face today.

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