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Perceptions of Responsibility in Online Learning for Students with Autism Spectrum Disorder: A Self-Determination Perspective

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Abstract

The recent Covid-19 pandemic resulted in school closures forcing students and teachers to the online learning environment. Currently, the Ministry of Education of Ontario mandates that all students, earn at least two online learning credits as a requirement for their Ontario Secondary School Diploma. Unless they have opted out or have been exempt, students with autism spectrum disorder (SASD) in general education classrooms must meet this requirement. Online learning requires SASDs to take responsibility for their learning by demonstrating the following sub-skills of responsibility: leadership, independence, self-advocacy, initiative, and organization. The current study explored whether, during the COVID-19 school lockdowns, eight intermediate teachers perceived their middle school SASDs as being responsible for their online learning. Through open-ended interviews, eight teachers reflected on their SASDs' ability to transfer the sub-skills of responsibility from in-class learning to online learning. The results were analyzed through the lens of self-determination and consisted of comparing the teachers' perception of a skill performed by a SASD during in-class learning to online learning. The results indicated that the teachers' perceived student responsibility as a student's ability to independently follow lessons, location tasks on the platform, completing tasks, and submitting tasks. Furthermore, the results revealed that the teachers perceived their SASDs as experiencing low levels of cognitive, behavioural, emotional, and agentic engagement. Based on the findings it is recommended that teachers refrain from assuming that SASDs can automatically understand and apply responsibility skills in online learning environments. Furthermore, teachers must understand that self-determination does not equate with simply being able to complete tasks independently but requires.

Keywords: *responsibility, self-determination, online learning, autism spectrum disorder*

Introduction

Adults with autism spectrum disorder (ASD) often face challenges in achieving fully independent lives (Tomaszewski et al., 2022). As services provided to students with autism spectrum disorder (SASDs) decline in high school and significantly decrease after leaving high school (Laxman et al., 2019), it is crucial to prepare SASDs for independence prior to high school. Although educational approaches for SASDs have shifted from segregated schooling to more inclusive practices, the MEO states, "providing a high-quality education for all is a key means of fostering social cohesion based on an inclusive society where diversity is affirmed within a framework of common values that promote the well-being of all citizens" (p. 60) persistent gaps and challenges remain, particularly in providing consistent support as students transition from high school to adulthood. To enhance the independence of individuals with ASD, educators must prepare them for such responsibility throughout their schooling experience. The need for preparing

SASDs for independent responsibility was highlighted during the COVID-19 pandemic which introduced a new set of challenges by shifting education to online platforms. The move to online learning impacted all students but posed unique difficulties for SASDs who often depend on structured routines and visual aids, SASDs “show impairments in recognising mental states in other people, particularly epistemic states like belief and knowledge” (Williams, 2010, p. 2) and have “difficulty determining the thoughts and intentions of others” (Meyers & Bagnall, 2015, p. 209). Furthermore, in September 2020, the Ontario Ministry of Education mandated all students in Ontario, Canada, to complete a minimum of two online learning credits as part of Ontario Secondary School Diploma requirements, unless they opt out or are exempted (Ontario Ministry of Education, 2022). While this policy aims to enhance educational flexibility, it raises concerns for SASDs who typically rely on structured routine and visual aids. The transition to online learning could pose challenges for SASDs in managing their responsibilities in a less structured environment. One potential strategy for addressing this challenge is the fostering of self-determination, which may help SASDs take greater responsibility for their learning. Therefore, this study examined whether, during the COVID-19 school lockdowns, teachers perceived SASDs in middle school as being responsible for their online learning through self-determination.

Self-determination theory provides a framework for understanding how SASDs can develop the skills needed for greater independence. Self-determination is a broad theory of human motivation that seeks to explain the dynamics of human needs, motivation, and well-being within a social framework (Chiu, 2021; Hsu et al., 2019). The theory encompasses an individual’s beliefs, knowledge, and skills that enable self-agency for the objective of obtaining personal goals (Wehmeyer, 2005). Thus, self-determined behaviour consists of “volitional actions that enable one to act as the primary causal agent in one’s life and to maintain or improve one’s quality of life” (Wehmeyer, 2005, p. 117). Teachers play a crucial role in fostering SASDs’ self-determination, which is essential for developing their independence (Tomaszewski et al. 2022).

To support SASDs achievement of self-determination, it is essential to create learning environments that not only foster personal agency but also cater to their distinct learning needs. The OME endorses inclusive classrooms that integrate students with exceptionalities alongside their typically developing peers, while acknowledging that SASDs often require specialized programming, such as the use of visual supports, schedules, video modeling, and reinforcements to obtain academic success (Ontario Ministry of Education, 2014; Tamm et al., 2021). In a traditional face-to-face classroom, these supports are provided through direct interactions with teachers and educational assistants who help SASDs take responsibility for their learning. However, the shift to an online learning environment introduces significant challenges due to the lack of immediate instructional support. Despite OME requirements for schools to provide learning opportunities tailored to individual student needs, such as hands-on learning opportunities, minimizing distractions, and providing small group or one-to-one instruction, these crucial supports may be difficult for educators to implement when teaching online (Floress et al., 2017; Wrestling & Fox, 2000; Meyer & Bagnall, 2015; Constantin et al., 2017; Hew & Cheung, 2011). Furthermore, there appears to be a Ministry assumption that SASDs will automatically adapt their

responsibility skills to an online environment without the physical support of teachers, education assistance, peers. This assumption may be flawed, as SASDs often struggle to generalize skills across different contexts (Hundert et al., 2014). Online learning, therefore, exacerbates the need for fostering SASDs' self-determination, as they must navigate learning with less direct support and adapt to a less structured environment. The absence of tailored, real-time support in online learning heightens the critical need for developing self-determination skills to help SASDs manage their learning responsibilities effectively.

In traditional face-to-face classrooms, SASDs benefit from the effectiveness of structured settings, visual routines, physical prompts, and the opportunity to observe and imitate others (Wrestling & Fox, 2000). These supports are crucial for managing learning responsibilities and building independence, to assist SASDs in developing independence, educators will rely on behaviour interventions, such as Applied Behaviour Analysis (ABA), which consists of routine, quiet cues and prompts, that are used to promote a desired behaviour (Constantin et al., 2017). The potential absence of these supports in online learning environments may exacerbate existing difficulties and impede the development of self-determination. Without the immediate and interactive support typically provided in the physical classroom, SASDs struggle with problem solving, organization, participation, and maintaining concentration and focus (Mavropoulou et al. 2010). Additionally, the online learning format may lack the social context and interactive elements that are crucial for SASDs, who often learn through imitation, discussions, and information exchange (Chiu, 2021). Although SASDs may struggle understanding others' perspectives or communicating their needs effectively, they often rely on imitating their peers to acquire a desired behaviour, such as taking responsibility for their learning (Chiu, 2021). When deprived of these interactions and supports, SASDs opportunities to practice their self-determination skills are diminished (Guay, 2022).

Enhancing self-determination involves not only overcoming the barriers presented by online learning environments but also actively fostering engagement across behavioural, cognitive, emotional, and agentic dimensions. Behavioural engagement involves students' active participant in academic tasks through attention, effort, intensity, and persistence (Chiu, 2021; Sintra et al., 2015). Cognitive engagement refers to students' psychological investment in the activity. That is, the student willingly initiates the cognitive effort required to understand the problem at hand and engages in flexible problem solving (Sintra et al., 2015). Emotional engagement encompasses students' sense of belonging and feelings towards educators, peers, and the material being taught (Chiu, 2021; Sintra et al., 2015). Finally, agentic engagement involves students' willingness to take initiative for their learning and requires students to be "proactive, persistent and self-starting when facing the difficulties that arise in achieving goals" (Balluerka et al., 2014, p. 1). When a student is displaying agentic engagement, they are actively contributing to the flow of information by seeking opportunities for enriching, personalizing, and/or modifying instructions and tasks (Sintra et al., 2015). Together, these dimensions of engagement are crucial for fostering the self-determination necessary for SASDs to navigate the demands of online learning environments.

The challenges faced by SASDs during the shift to online learning environments highlight the need to support their development of self-determination, particularly as they navigate their learning responsibilities with reduced direct support. OME's policy requiring online learning credits for high school graduation adds urgency to this need, as it assumes that SASDs can readily transfer their skills to online settings – a transition that may be far from seamless. While traditional face-to-face classrooms provide the structured environment and immediate feedback for SASDs to build independence the online format often lacks these elements, creating potential barriers to their learning and development. Addressing these challenges involves rethinking how educators can foster self-determination in SASDs in the online learning environment.

To better understand these dynamics, this study aims to contribute to the literature on the impact online learning has on SASDs' ability to be successful independent learners by exploring how middle school teachers perceive SASDs' responsibility for their on-line learning. Specifically, the study aims to address the following two research questions:

1. Did teachers perceive their SASDs as being responsible for their learning during COVID-19 mandated online learning?
2. What role did self-determination played in the SASDs ability to be responsible for their learning during COVID-19 mandated online learning?

Methodology

Participants

Participants were recruited through emails that were sent by principals from four school boards within the same region of northern Ontario during the first Covid-19 mandated online school year (2020-2021). Using non-probability sampling, participants consisted of eight white teachers (2 men; 6 women), aged 30-51, who taught grade seven and grade eight students (ages 12 to 14) identified with autism spectrum disorder. three teachers were from an English Catholic school board, three teachers were from a French Catholic school board, one teacher from an English public-school board, and one teacher was from a French public school board. None of the teachers had taught online prior to the school closures in March 2020.

Data Collection

Qualitative interviews, consisting of 20 questions, were conducted using standardized, open-ended, questions that were delivered in the same sequence to each participant. Prior to the interview, each teacher was provided with a copy of the questions; however, prompting questions were used to encourage detailed responses. Each interview was conducted using Google Meet, and in the teacher's preferred language of either English or French. All interviews were conducted in a private and neutral setting. Interviews were recorded and transcribed using the Otter audio-recording application.

Data Analysis

Transcripts were reviewed in conjunction with the audio recording to ensure accuracy and to capture nuances such as speech rate and emotional expression. The whole text and line-by-line analysis was used to identify meaningful themes. Each theme was initially assigned to two main categories: responsibility and self-determination. Responsibility was subdivided into assessing responsibility and being responsible for learning. The category of self-determination was subdivided into behaviour, cognitive, emotional, and agentic engagement. The teachers were assigned a number from 1 to 9. One teacher was labeled as Teacher 5 and Teacher 6 because she spoke separately about her experiences with two SASDs; however, when the findings for both SASDs were the same, the teacher is referred to as Teacher 5/6.

Results

Responsibility

Teachers reported that to be responsible for their online learning SASDs must actively engage in lessons and activities, as well as submit assignments. During online learning, they assessed responsibility as they did during in-class learning by focusing on indications of self-regulation, task completion, self-advocacy, organization, management, behaviour control, working habits, learning skills, ability to learn, positivity, independence, preparedness, initiative, ability to infer, and reliability. Although most teachers stated that they were more sympathetic and lenient online, teachers reported that SASD were unable to demonstrate responsibility both in-class and online. Factors contributing to their difficulty included the lack of human contact, poor emotional engagement, discomfort in the virtual learning environment, disrupted routines, and inadequate support.

Self-determination

Behavioural Engagement:

For a student to be behavioural engaged in their learning, they need to effectively communicate and collaborate with teachers and peers. Two teachers reported that their student communicated well with others both in-class and online. Three teachers reported that their SASD communicated well with others when it was a subject that interested them or if there was support from a teacher or an EA. The remaining teachers reported that their SASD was unable to communicate well, both in-class and online. In explaining why their SASD had difficulty communicating well online, teachers reported that their SASD found the online learning platform to be overwhelming, the SASDs focused on their own opinion, and made inappropriate remarks. For example, Teacher 4 explained that their student could only focus on himself, “He's not worrying about everybody else he's just, this is what I got to do, I'm going to do it.”

Collaboration. Due to difficulties with the learning platform, most teachers reported limited opportunities for collaboration. Two teachers stated that group discussions were challenging because students often spoke simultaneously, making conversations hard to follow. All students,

regardless of ability, turned off their cameras and mics to avoid collaborating. Teachers indicated that their SASD preferred to work alone, but would collaborate, without support, during small group activities. Three teachers clarified that their SASD only collaborated via written chat. Almost half of the teachers accepted the SASDs' lack of participation because social skills were viewed as a weakness for SASDs.

Assuming roles. Collaboration activities often require students to assume roles within the group. Compared to in-class, most teachers reported that their SASD had more difficulty accepting a role during online group work. However, when the topic was of interest to them or when support was provided the SASDs were able to assume a role. Only one teacher stated that their SASD had trouble assuming a role both during in-class learning and online learning.

Asking for Help. All the teachers reported that their SASD knew how to use different methods of communication online such as raising their hand, using the chat, emailing, and asking for a private meeting. However, teachers stated that their SASDs often failed to apply their knowledge. Teacher 1 stated that they only learned about the SASD's difficulty through a secondary source. As a result, teachers only realized their SASD was struggling or did not understand the assignment after it was submitted.

Cognitive Engagement

Following Instructions. Most teachers expressed that their SASD could not follow instructions during online learning, with two teachers reporting the same difficulty during in-class learning. When they followed instructions, it was because the activity was of interest to them or was similar to in-class activities. Furthermore, due to the teachers' and students' limited understanding of the learning platform, the teachers increased the amount of guidance they provided during online learning.

Establishing Priorities. Most teachers reported that their SASD had difficulty establishing priorities during online learning. When asked why their SASD was having difficulty establishing priorities during online learning, they believed the SASD prioritized the wrong steps, the wrong assignments, or the wrong things (e.g., playing video games or watching television). However, with support, almost half the SASD were able to establish priorities. Only one teacher stated that their SASD was able to establish priorities during in-class learning.

Following a Plan. Following a plan was perceived as being able to follow a daily schedule, step-by-step instructions, and basic routines. Nearly half of the teachers stated that their SASD was unable to follow a plan during online learning but could follow a plan during in-class learning. All Teachers reported that their SASD had difficulty following a plan that required transitions and most required detailed and tangible support during online learning. A reported reason for the difficulty was the distractions in the home. Strategies such as step by step instructions and providing support in the same format as during in-class learning was found to be beneficial.

Organization. Almost half the teachers reported that their SASD was organized during in-class and online learning. Two SASD were reported as disorganized only during online learning. Three teachers stated that their SASD was disorganized during in-class and online learning. To help their students stay organized online, two teachers photocopied the activities that went with

the lessons and placed the pages into a duo-tang, but the SASD still needed assistance finding the right page.

Time Management. Almost half of the teachers noted poor time management among their SASD in both in-class and online settings, despite support. Only one SASD demonstrated independent time management in both environments. Three teachers reported effective time management with support in both settings, while one reported independence in class but not online. Teachers reported using strategies like check-ins, prompting, and scaffolding to aid SASD in managing time and staying focused. However, three teachers observed SASD spending time watching television or playing video games rather than completing tasks. All teachers indicated that when support was not provided, the students rushed through their work or became distracted.

Monitoring Progress. Nearly half the teachers reported that their SASD was unable to manage their progress during online learning; with two having the same difficulty in-class. During both in-class and online learning, three teachers stated that their SASD required support to monitor their progress, such as daily schedules. Only one reported that their SASD could independently monitor their progress during both in-class and online learning.

Recognizing Areas of Weakness. Only two teachers stated their SASD was aware of their areas of weaknesses during online learning, while the remaining SASDs were viewed as having more difficulty acknowledging their areas of weaknesses during online learning compared to in-class learning. All the teachers reported that it was more difficult to observe SASDs' areas weakness during online learning compared to in-class learning. Most teachers commented that during in-class learning they would circulate to ensure the students understood the task, were on track, observe weakness and when appropriate, prompt the SASD, but were unable to do so online.

Emotional Engagement

Four teachers reported that their SASD consistently approached new situations with a positive attitude, with one teacher observing a positive attitude during in-class learning. Conversely, four teachers stated that their SASD did not approach new situations with a positive attitude during online learning, with three teachers reporting similar behaviour during in-class learning.

Agentic Engagement

Motivation. During online learning, two teachers reported that their SASD demonstrated motivation by asking questions and paying attention, two reported that their SASD was only motivated if the topics were of interest and the remaining five teachers stated that their SASD were not motivated at all during online learning. When asked if SASDs' level of motivation during online learning was like their in-class motivation, only one teacher stated that their SASD was not motivated during in-class learning.

Initiative. Most teachers reported that their SASD was able to demonstrate initiative during online and in-class learning. In contrast, one teacher's SASD demonstrated initiative only online

and four only demonstrated initiative during in-class learning. The fact that most SASDs were able to take initiative in both learning environments suggests that initiative is an area of strength for SASDs.

Independence. Three teachers stated that their SASD demonstrated independence during both their in-class and online learning, one only during online learning, three only during in-class learning, and two were unable to demonstrate independence during in-class and online learning.

Innovation. During online learning, two teachers reported that their SASD demonstrated innovation, but only one was innovative during in-class learning. The remaining teachers reported that their SASD did not demonstrate innovation during online learning. The teachers believed their SASD was less innovative during online learning because SASDs were not putting as much effort and creativity in their work as they did during in-class learning.

Discussion

This study examined whether, during the COVID-19 school lockdowns, teachers perceived middle school SASDs as being able to assume responsibility for their online learning through self-determination. Nine middle school teachers who taught SASDs discussed their perception of SASDs' ability to be responsible for their online learning. Like previous research (e.g., Eshraghi et al., 2020; Wang et al., 2023), the teachers' believed that COVID-induced changes to SASDs' learning routines had a negative effect on the SASDs' ability to be responsible for their learning. Specifically, the teachers perceived their SASDs' ability to be responsible for their learning to be weaker during online learning than during in-class learning.

Examining teachers' perception of SASDs' ability to be responsible for their online learning through the lens of self-determination theory revealed that SASDs may experience low levels of cognitive, behavioural, emotional, and agentic engagement. The fact that the SASDs were weak in all four domains is not surprising given the direct relationship executive functioning has on all four domains of engagement. Specifically, executive functioning is an underlying factor of cognitive engagement and impacts a SASD's behaviour, emotions, and ability to initiate a constructive contribution to their learning (Fernandez-Prieto, 2020; Theodoratou et al., 2023). As with Duncan et al. (2022) the teachers in the current study reported that their SASDs experienced difficulties establishing priorities, following plans and instructions, time management, and monitoring progress, all of which are domains associated with executive functioning. However, unlike previous research (e.g., Fernandez-Prieto, 2020; Theodoratou et al., 2023), almost half the SASDs in the current study were perceived as having good organizational skills when learning both in class and online. This finding may be due to the teachers' use of visual models and prompting. Specifically, the use of check lists that ensured their work area was adequately prepared, using printed materials placed in duo-tangs, displaying classroom routines, and verbal positive reinforcement. However, further investigation is needed to determine which types of visual models and prompting are the most effective for the transference of organization skills to the online learning environment.

The SASDs' weak executive functioning may have impacted their inhibition and emotional regulation and control. While the teachers attempted to encourage behavioural engagement in the

form of online classroom discussions and group work, few opportunities for collaboration were provided because the teachers were uncomfortable with the learning platform. The teachers' inability to effectively incorporate social interaction within the online learning platform may have negatively impacted the SASDs' emotional engagement. Specifically, teachers' limited ability to manage large online classroom discussions may have resulted in SASDs experiencing sensory overload (Fernandez-Prieto et al., 2021; Stenhoff et al., 2020). As sensory overload is associated with isolation, disinterest, indifference, and emotional lability (Fernandez-Prieto et al., 2021), it provides an explanation for SASDs' use of disengagement as a coping strategy during online discussions. It also supports Fernandez-Prieto et al.'s (2021) supposition that SASDs who have weak emotional regulation may display anxiety isolation, somatic complaints, and rule-breaking behaviour. The emotional weaknesses displayed by the SASDs may, in turn, have a negative impact on their social skills, including essential aspects such as interpreting non-verbal cues and responding appropriately to others (Sundberg, 2018). Consequently, this could hinder their ability to develop and sustain friendships. By providing SASDs with opportunities to participate in small groups or one-on-one interactions it may prevent them from feeling overwhelmed by the stimuli associated with large online group discussions and enable them to develop friendships with their peers.

To develop and sustain friendships SASDs need to focus on both the task at hand and collaborating with their peers. The teachers believed that their SASDs prioritized the task associated with the discussion rather than actively engaging in their peers' ideas and opinions. Furthermore, the SASDs appeared to focus more on understanding and navigating the learning platform than participating in and concentrating on the lesson. These misguided prioritizations may have hindered the SASDs' ability to collaborate and respond to others effectively in the online environment. As increased participation in group work and group discussions strengthens a SASD's ability to collaborate with others (Betta, 2015), teachers need to explicitly demonstrate to SASDs how to navigate the learning platform prior to engaging in a task or discussion. Following the demonstration, the teacher can assign roles and a check list of tasks that are to be completed during group work. Such an approach may correspond with improved emotional engagement with their peers, teachers, and content of the course.

Lastly, the findings indicated that during online learning the teachers had difficulty identifying when SASDs required assistance. The teachers attributed the difficulty to their inability to directly observe the SASDs' completing tasks. As a result, teachers relied on their SASDs agentic engagement to independently recognize when they were having trouble and ask for assistance without prompting. While the SASDs understood how to ask for assistance online (e.g., raising a virtual hand, asking a question via chat or email), the SASDs rarely, if ever, asked for assistance. This finding suggests that the SASDs were unable to demonstrate causal agency¹ for their learning. Therefore, teachers must ensure that they are scaffolding agency skills. Finally, teachers need to increase their familiarity with the learning platform to ensure that they can assess

¹ an individual's ability to engage in a course of action volitionally and intentionally for the purpose of obtaining a desired outcome (Wehmeyer, 2005).

SASDs' performance and provide feedback in an effective and efficient manner thereby improving SASDs' ability to self-advocate.

Conclusion

The findings suggest that teachers' understanding of self-determination in SASD's learning may have influenced their perception of responsibility. Teachers viewed responsibility as a student's ability to independently follow lessons, locate tasks on the platform, complete tasks, and submit tasks. However, self-determination does not equate to independence; rather, it requires a supportive learning environment that fosters autonomy, competence, and relatedness (Hsu et al., 2019). Instead of recognizing that an SASD had selected an effective and efficient learning strategy that enabled them to complete a task promptly, teachers perceived the SADS as hurrying and lacking motivation. Consequently, teachers ignore the volitional actions of self-determination, that is, the "making of conscious choice or decision with deliberate intention" (Wehmeyer, 2005, p. 117). Therefore, the problem may lie in the fact that the SASDs were taking volitional actions that were in contraction to the actions and objectives desired by the teacher.

Limitations

While the study highlights teachers' perceptions of SASDs' ability to demonstrate responsibility through self-determination, several limitations should be noted. Firstly, the sample size may have led to sample bias, impacting the generalizability of results. Secondly, the reduced expectations during the first school shutdown may have influenced findings. Thirdly, no comparison was made with neurotypical students' ability to be independently responsible for online learning. Lastly, the study lacks the perspective of SASDs themselves, which could provide valuable insights into their experiences and perceptions regarding responsibility and self-determination in learning.

Recommendations

Based on the findings of this study, several recommendations and strategies can be implemented to help SASDs develop the skills necessary to take responsibility during online learning. One key recommendation is to integrate more aspects of the self-determination theory into online learning through adopting a student-centered learning approach. A student-centered learning approach will enable teachers to tailor their lessons to individual learning styles and resources (Bedenlier, 2020). When a teacher uses a student-centered learning approach, they provide students with unique learning opportunities, encourage students to make their own choices and decisions, and integrate individualized learning goals (Alamri et al., 2020). By encouraging self-advocate, time management, effective communication, and have positive attitudes, student-centred learning may significantly increase the likelihood that SASDs will take responsibility for their learning. Incorporating these strategies into online learning environments may better support the development of self-determination in SASDs, ultimately enhancing their ability to manage their educational responsibilities independently.

Further Research

The current research provides several opportunities for future research on the topic of SASDs in an online learning environment. First, a teacher in the current study explained that during in-class learning, their school had a friend group for SASDs that was delivered by an EA. The friend group focused on socializing with other peers about any topic that interested them or that was important to discuss. Investigating whether an online ‘friend group’ would help students develop self-advocacy and leadership skills would be valuable. Second, another teacher mentioned the importance of dedicating time to explaining the online platform and routines to students and allowing them to practice in advance. This preparation enabled students to become more comfortable with online learning and take more responsibility for their learning. Future research could explore whether a mandatory instructional course focused on familiarizing students with the learning platform and class routines would help SASDs develop their online learning responsibilities. Additionally, research could examine the effectiveness of providing electronic checklists to help students stay organized. It would be insightful to observe whether students would use an electronic checklist with embedded cues to guide them in taking responsibility for their learning. Lastly, the findings of the study suggest the need for a Ministry of Education guide aimed at creating an inclusive online environment. The guide should be designed to assist teachers of SASDs in the intermediate and senior division adjust their teaching practices, integrate technological pedagogical knowledge (Mishra & Koehler, 2006), and implement accommodations that support the development of responsibility in an online environment. Once developed, the guide should be rigorously assessed for effectiveness in enhancing the self-determination and responsibility skills of SASDs.

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Investigation of the Effects of Using Mathematics Literacy Questions in Primary School Mathematics Teaching on Mathematical Literacy Success

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Abstract

This study is based on the students' readiness to use the basic mathematical knowledge they learned in their daily lives in the primary school years, when the foundations of mathematics teaching were laid. Therefore, the effect of teaching primary school fourth grade students consisting of mathematical literacy questions appropriate to the curriculum and adapted to the level on the success of students' mathematical literacy, the development of mathematical competencies in the teaching process and students' views and thoughts were investigated in all aspects. In this study, the process of understanding and solving the mathematical literacy questions of the fourth-grade students in primary school was examined by applying the intertwined mixed design in which the quasi-experimental study was dominant. At the end of the study, it was observed that mathematics literacy teaching positively affected students' mathematical literacy achievements, that there was an improvement in the development of mathematical competences of representing, communication, reasoning and problem solving. The students stated that the questions in the instruction were somewhat difficult, intelligence-enhancing and different, and that they would like to see these questions in school mathematics.

Keywords: *Mathematical literacy, mathematical competencies, primary school mathematics curriculum, concrete operations period.*

1. Introduction

In order for the individuals to adapt to the rapidly changing and developing world, the function of schools has been updated as transferring the learned information to the real life as well as learning the basic information. This is simply because it is easy to access information in this day and age, but the principal issue here is to teach how to use the information when due (Altun, 2020). Therefore, the daily life skills that the individuals need in order to solve the problems they encounter in real life are expected to be acquired during their school years. It is crucial to note that today, PISA is an international student assessment program that measures students' ability to use the knowledge and skills they learn at school in their daily lives (PISA MEB, 2022).

The subject of this study is Mathematical Literacy (ML), which is one of the main areas of PISA. Many different strategies and approaches have been observed in the process of developing mathematics from the past to present day's mathematical literacy. When we look at this historical process of mathematics teaching, behaviorist approaches have been effective from the beginning of the 20th century to the mid-century. Behavioral approaches have adopted to explain learning in terms of observable behaviors that cannot be understood what is going on in the mind. After the second half of the 20th century, cognitive approaches came to the fore (Altun, 2015; Selek, 2021).

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At the beginning of the 21st century, together with international assessment and evaluation studies, the role of mathematics in daily life has been emphasized with mathematical literacy (Breen, Cleary & O'Shea, 2009).

Altun (2020) defined Mathematical Literacy (ML) as being competent in using mathematical knowledge and skills, that is, understanding a problem situation in which mathematics can play a role, feeling the need for mathematics in making the final decision and being able to utilize mathematics. Sfard (2014) described mathematical literacy as the ability to participate in mathematical communication when it was essential for us to understand the world and digitize it. Therefore, it is significant for students to learn how, about what and when to talk mathematically (Sfard, 2014, cited in Bolstad, 2019).

The ML definitions mentioned above have clearly focused on the mathematical process in which the individual is active in order to solve the problems encountered in daily life and the role of mathematics in the world. Many studies have been conducted on the meaning and definitions of mathematical competence concepts. The mathematical competencies in the relevant literature include being knowledgeable about, understanding, doing, using and having an idea about mathematics and mathematical activities in various contexts where mathematics can play a role (Niss and Højgaard, 2011). Competencies are cognitive processes that need to be activated in order to solve a problem by associating it with the real world in which the problem arises (Saenz, 2009). Mathematical competencies are associated with the enactment, application and practice of mathematics; that is, it is simply to do mathematics. Even though this indeed requires a great of content knowledge and theoretical understanding of the structure of mathematics, mathematical competencies go beyond such knowledge by being action-oriented (Biehler, 2019). As far as the definitions of mathematical competencies are concerned, their common point focuses on the cognitive process of the student at the stage of solving a problem, that is, on doing mathematics, and mathematical competencies and knowledge proceed in a system that affects each other without any conflict (Niss and Højgaard, 2019). In order to enable practicality in reports on mathematical literacy, students' responses to items were explicated separately under each mathematical process, as six in some publications (OECD, 2004; 2006) and as seven basic mathematical competencies in some other publications (OECD, 2013; PISA MEB, 2012). These mathematical competencies are modeling, problem solving strategies, reasoning, argument generation, communication, representation, using symbolic technical language, processes, and using mathematical tools equipment. The first three mathematical competencies are related to doing mathematics, while the other four are competencies that help do mathematics (Altun et al., 2022). In the case of this study, these competencies include communication, representation, reasoning, argument generation, and problem-solving strategies.

This study was conducted according to the primary school fourth grade mathematics curriculum. In mathematics teaching, a specification table was prepared by taking into account the primary school fourth grade mathematics learning areas, sub-learning areas, achievements and class level limitations during an academic year according to the curriculum. The Primary School Fourth Grade Mathematics Course Curriculum consists of four learning areas: numbers and

operations, geometry, measurement and data processing. Although all learning areas are included in each grade level, some sub-learning areas come into play after a certain grade. The learning areas and percentages in this curriculum are numbers and operations 47.9%; measurement 29.6%; geometry 16.9%; data processing rate 5.6% (MEB, 2018).

Cognitive development theories and mathematics teaching theory, which are the theoretical framework of this study, were included in mathematics teaching. Cognitive development theories in mathematics teaching. Piaget and Vygotsky tried to identify how the child understood the world around him/her at different ages and why s/he regarded it that way. Therefore, Piaget and Vygotsky investigated the development of the child's active mental activities, namely their cognitive development (Senemoğlu, 2018). According to Piaget's theory of cognitive development, the age group of fourth grade primary school students is 9-10 years old, so it coincides with the concrete operational period. It was stated that the students in the concrete operational stage performed the activities such as mental development, progress in the development of the concept of number, preservation of weight and partial volume, grouping, hierarchical classification, correlation, and imagination, according to Piaget's theory of cognitive development. The learning process, which included students' ability to perform mathematical operations, was explicated by the concrete operations period. Despite the criticism that there were individual differences among the children and that Piaget's studies were based on observations and experiments without relying on statistical data and analysis, the concepts he explained about mental development and the connections between concepts made a significant contribution to learning and teaching (Başal, 1995; Günçe, 1973; Nuhoglu and Ceylan, 2012; Senemoğlu, 2018). The theory of mathematics teaching is Realistic Mathematics Education (RME). One of the mathematics teaching theories, RME is an approach that focuses on the child's learning and doing mathematics (Altun, 2015). The characteristic of RME focuses on rich, "realistic" situations in the learning process. In mathematization, the child should discover knowledge by dealing with environmental situations that are appropriate to the subject, and formal knowledge, definitions and concepts should be the last points to be reached. Learning mathematics and being able to do mathematics should obtain the targeted information as a result of a problem-solving activity by making use of a real situation or an imaginary fiction (Altun, 2015; Gravemeijer and Doorman, 1999; Verschaffel, De Corte & Vierstraete, 1999). In this study, the children who encountered mathematical literacy solved the problems requiring mental processing through mutual interaction under the guidance of their peers, their classmates, and the adult teacher in order to solve the problems in the classroom environment.

Therefore, the primary school years, when the foundations of mathematics are laid, are very important in terms of teaching mathematics. The connection established between primary school mathematics, where basic mathematical knowledge and skills are acquired, and real-life situations will form a solid foundation for mathematics that the child in the concrete operations period will build in his later school life. The aim of this study is to consider mathematics teaching as a whole and to contribute to the development of students as individuals who can solve the problems they encounter in their daily lives. Furthermore, the positive effects of teaching on mathematical literacy on the development of mathematical literacy of students, especially at secondary school,

high school and undergraduate level, have been reported in the relevant literature. The studies in which the mathematical knowledge learned in primary school years, when the foundations of mathematics teaching were laid, were transferred to real-life situations within the scope of mathematical literacy are limited. Therefore, considering the positive effects of mathematics literacy teaching, this study meets the need for teaching that includes the problem situations faced by primary school students in daily life. In this study, which is a first in the field of primary school level, it is expected that the primary school students who encounter real life problems will contribute to the development of mathematical literacy in the following school years by emphasizing the importance of teaching basic mathematics. For this purpose, the sub-problems of the study are listed below.

1. How did ML problem solving education affect the ML achievement level of the fourth grade primary school students?
2. What was the effect of ML problem solving education on the mathematical competence development of the fourth grade primary school students?
3. What were the opinions and thoughts of the fourth grade primary school students about the ML problem solving education?

2. Method

The study was conducted with the nested mixed pattern method, in which quantitative and qualitative data were collected simultaneously. In the quantitative part of the study, the data obtained from the mathematical literacy achievement test were included. Since it is not possible to create study groups by randomly in quantitative research, a quasi-experimental design was applied (Büyüköztürk, 2013; Creswell, 2013; Çepni, 2014, Karasar, 2018). The qualitative part of the study was the case study. A case study provided first-hand information about people and events when the research was built on descriptive or explanatory questions. Case study stages consisted of planning, designing, preparing, collecting, analyzing and sharing (Yin, 2003; 2009). In the quasi-experimental study, a total of 39 primary school fourth grade students (experimental group 20, control group 19 students) participated. In the case study, student answer sheets were examined and semi-structured interviews were conducted with 9 students in the experimental group.

In the quantitative part of the study, the Mathematics Literacy Achievement Test (MLAT) was used to identify the mathematical literacy achievement levels of fourth grade primary school students. MLAT consists of mathematical literacy problems explained in the PISA 2000, 2003, 2012 cycles and questions taken from literature sources. In the development of MLAT, the data including question contexts and real-life situations within the scope of the study were organized and adapted according to the level of primary school fourth grade students. The questions adapted to the grade level were classified according to mathematical literacy subject areas, question contexts, question types and mathematical competencies. Subsequently, the questions were supported with visuals for the primary school fourth grade students who corresponded to the concrete operations period. Gutierrez (1996) defined visualization as the concretization and organization of abstract ideas in a way that could be easily perceived by the visual sense with the

help of given visual elements (pictures, graphics, etc.), and the creation and transformation of all representations of shapes created in the mind and in spatial nature to do mathematics (Gutierrez, 1996, cited in Çilingir and Artut, 2017).

Content validity was estimated by testing the applicability or relevance of the test content through rational analysis by a competent expert panel (Tohir et al., 2020, cited in Kolar and Hodnik, 2021). In order to evaluate the validity of the 14 mathematical literacy questions in the pilot application achievement test conducted one year before the main application, the opinions of four faculty members -who are experts in the field of mathematics education, a primary school teacher and a Turkish language teacher- were obtained. Afterwards, a pilot application was conducted with a total of 47 students studying in a different primary school who were not in the study group and the content validity of the questions for the students was examined. As a result of the pilot application and interviews, one question was removed from the MLAT and 13 questions (7 open-ended questions, 6 test questions) were used in the main application. The main application was a semi-experimental application that lasted 10 (ten) weeks, including pre-test and post-test applications, in order to examine the levels of mathematical literacy achievement in the 2020-2021 academic year. Due to pandemic restrictions, distance education was implemented, and the retention test could not be applied to the students.

The data collection tools used in the qualitative part of the study were pre- and post-test student answer sheets examining the mathematical competencies that emerged during the teaching process, and semi-structured interviews were collected from students' views on teaching. In the semi-structured interview, 7 questions were asked to 9 students who showed low, medium and high achievement according to the achievement test results (findings related to 2 questions are given). The interviews were audio-recorded, transcribed into text and analyzed. Validity and reliability of qualitative data. Krefting (1991) used expressions such as credibility, accuracy of results and competence of the researcher instead of the validity and reliability expressions used in quantitative research in qualitative research (Krefting, 1991, cited in Başkale 2016). Cuba and Lincoln (1982) drew attention to the fact that there should be credibility rather than validity-reliability in qualitative research. Four criteria were emphasized for credibility: credibility, reliability, confirmability and transferability (Cuba and Lincoln, 1982 cited in Başkale, 2016).

2.1 Data analysis

The pre-test and post-test achievement scores of the experimental and control groups constituting the quantitative data were analyzed using the Social Sciences Statistical Package (SPSS). According to the rubric created, achievement scores were calculated with two (2) points for correct answers, one (1) for incomplete answers, and zero (0) points for incorrect and blank answers. The analysis methods performed according to achievement scores for the experimental and control groups were; t-test for independent samples for pre-test scores, t-test for independent samples for post-test scores, and pre-test-post-test change analysis (repeated ANOVA). Qualitative data, pre-test and post-test answer sheets of experimental and control groups were subjected to content analysis in order to follow the development of mathematical competencies. According to Turner, Dossey, Blum and Niss (2013), Mathematical competencies are explained in four levels

from 0 to 3, and the study analyzes the competency definitions and level definitions. In the content analysis, mathematical competencies and levels were coded and a table was created. These codes were presented in the table with their frequencies and percentages. Then, the interview records with students who showed low, medium and high performance according to achievement tests were converted into text and descriptive analysis was performed. At the end of the study, the data were combined and interpreted.

3. Results and Discussion

The results related to the sub-problem of “*How did ML problem solving education affect the ML achievement level of the fourth-grade primary school students?*” are presented below:

Primarily, in order to understand whether the experimental and control groups were equal and in an attempt to identify the significance of the difference between the pre-test total scores, the data should exhibit normal distribution, there should be no statistically significant difference between the variances of the groups (equality of the variances of the groups), and each data should be independent of the other (Can, 2017). Therefore, in order to observe the improvement in the mathematics literacy achievement levels of the fourth-grade primary school students, initially, the conformity of the experimental and control groups to the normal distribution was investigated.

The Shapiro-Wilk test is recommended when the number of observations regarding the normality of the distribution is below 30 (Can, 2017). The Shapiro-Wilk test and other indicators were examined in order to find out whether the difference between the pre-test scores was significant. As a result of these indicators, since the pre-test scores showed a normal distribution, an independent sample t-test was performed from the parametric tests (Table 1).

Table 1. Pre-test independent samples t-test results of primary school fourth grade experimental and control groups

Groups	N	\bar{x}	S	sd	t	p
Experimental Group Pre-Test	20	12,75	4,31	37	,323	,749
Control Group Pre-Test	19	12,36	2,89			

It was found that the pre-test mean scores of the experimental and control groups were $\bar{x}_E=12.75$ for the experimental group students and $\bar{x}_C=12.36$ for the control group students. As a result of the t-test for the independent sample, it was found that there was no statistically significant difference between these two groups [$t_{37} = ,323$; $p > .05$]. In this case, it is possible to say that the pre-test mean scores of the experimental and control groups were not statistically different from each other and that the groups were equal. In order to investigate the significance of the difference between the post-tests of the experimental and control groups, where there was no statistically significant difference between the pre-test results, the Shapiro-Wilk test results and other indicators were examined. According to these results and indicators, the parametric independent sample t-test was applied (Table 2).

Table 2. Post-test independent samples t-test results of primary school fourth grade experimental and control groups

Groups	N	\bar{x}	S	sd	t	p
Experimental Group Post-Test	20	15,85	4,63	37	3,281	,002
Control Group Post-Test	19	11,47	3,59			

In the t-test for independent samples conducted to identify whether teaching ML questions had a significant effect on ML achievement, it was observed that there was a significant difference between the post-test mean score of the experimental group students, $\bar{x}_E=15.85$, and the post-test mean score of the control group students, $\bar{x}_C=11.47$ [$t_{37}=3.281$, $p < .05$]. In this case, it is possible to say that teaching ML questions had a significant effect in favor of the experimental group.

In this study, repeated ANOVA test was applied in an attempt to examine the changes between pre-test and post-test scores of the experimental and control groups. The analysis evaluated the mean changes in pre-test and post-test scores for both groups, as well as group and test interactions. The repeated ANOVA analysis results are presented in Table 3.

Table 3. Repeated ANOVA Analysis Result Values

	Type III Sum of Squares	sd	Mean of Squares	F	p
Score	23,692	1,000	23,692	4,523	0,040
Group * Score	77,744	1,000	77,744	14,843	0,000

Score Effect: It was found that the overall effect of the scores (pre-test and post-test) was statistically significant ($F_{(1,38)}=4.523$, $p=0.040$). This result shows that there was a significant change between the tests in general. In other words, a change was observed in the test results in general for all participants.

Group * Score Interaction: It was found that the group and test interaction was also statistically significant ($F_{(1,38)}=14.843$, $p < 0.001$). This result shows that there was a significant difference between the responses of the groups to the tests. Repeated ANOVA analysis showed that there was a significant interaction between the experimental and control groups. The increase in the score of the experimental group in the post-test indicated that the intervention applied to this group was effective. On the other hand, no such increase was observed in the control group. These results show that the experimental intervention contributed to the differentiation between the groups and had a positive effect on the experimental group.

The results related to the sub-problem of “*What was the effect of ML problem solving education on the mathematical competence development of the fourth-grade primary school students?*” are presented below:

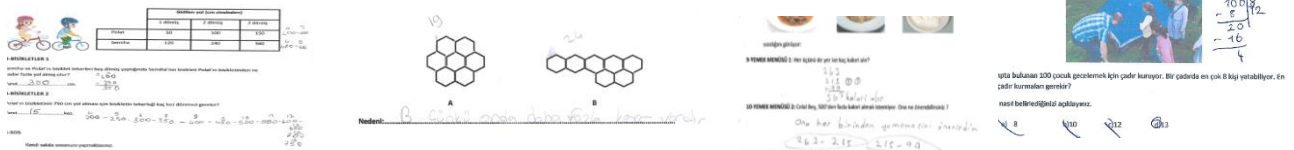
In order to reach a holistic conclusion about the development of mathematical competencies, the codes that can be indicators of the development of comprehensive competencies are presented in performance tables with frequencies and percentages (Table 4).

Table 4. Distribution and percentages of mathematical competencies according to pre-test and post-test

Mathematical Competencies	Rating of Mathematical Competencies	Experimental Group				Control Group			
		Pre-Test f	Pre-Test %	Post-Test f	Post-Test %	Pre-Test f	Pre-Test %	Post-Test f	Post-Test %
Representation	T0	17,6	88	13	65	13	68	14	73
	T1	2	10	5	26	4	21	2	11
	T2	0,2	1	1	6	0,1	1	0,7	4
Communication	B	0,2	1	0,5	3	2	10	2,3	12
	I0	19,5	97	16,5	82	16	84	16	84
	I1	0	0	3	15	2	11	1	5
Problem Solving	B	0,5	3	0,5	3	1	5	2	11
	P0	13	65	8	40	7	35	8	42
	P1	6	30	11	55	11	60	9	46
Reasoning	B	1	5	1	5	1	5	2	12
	M0	14	70	12,5	62	10	53	11	60
	M1	5	25	7	35	7	35	6	28
	B	1	5	0,5	3	2	12	2	12

In the analysis of the students' answer sheets before and after the mathematical literacy instruction indicated in Table 4, the frequency and percentages of the experimental and control groups are given for the representation competence from T0 to T1 and T2 levels, communication competence from I0 to I1 levels, strategy formation competence for problem solving from P0 to P1 levels, reasoning argument generation competence from M0 to M1 levels (B=Unanswerd questions).

Image 1. Student responses according to mathematical competencies are representation, communication, creating strategies for problem solving, reasoning and producing arguments



The results related to the sub-problem of “What were the opinions and thoughts of the fourth-grade primary school students about the ML problem solving education?” are presented below:

The students who participated in the interview were grouped according to their pre- and post-test success status as Category 1 for low success, Category 2 for medium success, and Category 3 for successful students. The student codes made are S1, S2, S3, S4, S5, S6, S7, S8, and S9. The responses of the students in the concrete operations period are presented especially with their own expressions, and the analysis of the questions is given with the frequency table and student distribution. The responses given to the question "What do you think about the Mathematics Literacy questions you solved?" in the interview are in Table 5.

Table 5. Students' views on mathematical literacy questions

ML Questions	Category 1			Category 2			Category 3			f
	S1	S2	S3	S4	S5	S6	S7	S8	S9	
Easy								X	X	2
Difficult	X		X		X	X				4
Their stories are different from life	X						X			2
Enjoyable	X		X	X	X			X		5
Illustrated				X	X				X	3
Intelligence developing			X		X	X	X		X	5
Requiring attention								X	X	2
There are no options in the questions		X			X		X			3
You decide for yourself which operation to take and how to solve it.				X		X				2
It is necessary to understand the question			X		X				X	3
It takes two or three reads to understand the question									X	1
you need to make planning to solve the problem			X							1

Two students with low success stated that the questions were difficult, two students were fun; two students with medium success stated that the questions were difficult, two students were fun, two students had pictures, two students were brain-developing, two students decided on the solution of the question and the solution strategy themselves; two students with high success stated that they were easy, two students were brain-developing, and two students required attention. According to the general student distribution, the ML questions were difficult, brain-developing, and fun. Sample student responses are below:

Student: “The questions are very, very different, the stories are different, you need to rack your brain a lot more, there are no choices.”

Student: “There are operations to be done in the questions in the textbooks, you find the operations to be done in these questions yourself. By reading, you decide which numbers to add with which number.”

The distribution and percentages of students' responses to the question "Would you like to see the mathematical literacy questions you solved in mathematics class or in mathematics books? What do you think?" are presented in Table 6.

Table 6. Students' thoughts about the presence of ML questions in mathematics classes or textbooks

ML Questions	Category 1			Category 2			Category 3			f	%
	S1	S2	S3	S4	S5	S6	S7	S8	S9		
I would like to see these questions in math class even if they are difficult						X				1	11
Possible		X							X	2	22
I would like to see	X		X	X	X		X			5	56
I don't want to solve such easy questions in math class, but they can be present in textbooks								X		1	11

50% of the students said they wanted to see mathematical literacy questions in mathematics class or in mathematics textbooks, and 22% said they could have these questions in mathematics class and textbooks.

4. Discussion and Conclusion

Based on the results of the present study, there was a significant difference between the groups' achievement scores. Therefore, it is possible to say that the teaching was significant in favor of the experimental group on the achievement of mathematics literacy. Examining the effect of primary school mathematical literacy teaching on student achievement, Cotic (2010) found that in an experimental study that lasted for six months with third grade students, it improved children's ability to solve real-life problems as well as their mathematical literacy; Firdaus, Wahyudin and Herman (2017) concluded that fifth grade students were more effective in solving real-life problems in developing mathematical literacy than the traditional teaching model; Amir, Mufarikhah, Wahyuni, Nastun and Rudyanto (2019) found that the game design developed for first-year students supported mathematics learning success in solving mathematical literacy problem; Oktiningrum and Wardhani (2020) concluded that mathematics problems that provided

the development of high-level thinking skills with contexts involving Indonesia's natural beauties and cultural heritages had a potential impact on the assessment of students' mathematical literacy and that students solved all tasks with nearly 75% attention and seriousness; similarly, Çilingir and Artut (2017) concluded that being visual mathematics literate increased visual mathematics achievement of the fourth grade students who were given TIMSS questions conducted with RME approach. It is clear that this study overlaps with the relevant literature studies; that is, the findings are consistent with the similar results of the teachings conducted with daily life problems.

It is possible to say that the effect of the given mathematical literacy teaching on the mathematical competences of the students improved the levels of the experimental group students compared to the control group students, related to the four mathematical competences of representation, communication, problem solving and reasoning. Abira, Suyitno and Latiana (2021) examined mathematics literacy with a problem-based learning model of fifth grade primary school students with visual, auditory and kinesthetic learning styles in Indonesia. The study revealed that the learning applied by the problem-based learning model was effective on the students' mathematical literacy competencies; it was concluded that the mathematical literacy of the students with visual learning styles corresponded to the seven mathematical competencies, and they mastered almost all of them. In their study, Abira, Suyitno and Latiana (2021) found that problem solving practice teaching was effective on the students' mathematical literacy competencies, increased their ML achievements; with the program she designed and implemented, Ülger (2021) reported that all mathematical proficiency levels increased and ML education had a positive effect on the development of mathematical competencies; despite some differences, the results obtained were consistent in general. The most obvious difference in this study was that no single competence development such as all mathematical competence development or problem-solving competence was observed. The common aspect with the relevant studies conducted was the effectiveness of mathematical literacy in the development of mathematical competence and similar results were obtained. According to the responses given to the question of what they thought about the mathematical literacy questions in the semi-structured interview, the low-achieving students stated that the questions were difficult, fun, the medium-achieving students stated that they were difficult, fun, illustrated, intelligence-developing, and that they decided on the solution and solution strategy themselves, while the high-achieving students stated that they were easy, intelligence-developing, and requiring attention. In general, the students stated that the ML questions were difficult, intelligence-developing, and fun. Furthermore, the students stated that they wanted to see mathematical literacy questions in mathematics classes or in mathematics textbooks. In this study, the effects of mathematical literacy teaching on students' mathematical literacy success, the development of mathematical competencies during the teaching process, and their views and thoughts about mathematical literacy questions were examined in all aspects.

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SAMPLE QUESTIONS

BICYCLES: Polat and Semiha ride bicycles of different sizes. The table below shows the distance their bikes take for each full turn of the wheels.



	Distance travelled (in cm)		
	1 turn	2 turns	3 turns
Polat	50	100	150
Semiha	120	240	360

1- When Semiha and Polat's bicycle wheels make five turns, how much further will Semiha's bicycle go than Polat's bicycle? Answer.....cm.

2- How many times should the wheel of Polat's bicycle turn in order for the bicycle to travel 750 cm?

KENNEL



The simple hut that a kennel manufacturer builds includes models with only one window and door. Gökhan has chosen the model above for his dog. The illustrations below show rear views of the different “simple” kennel models. Only one of these drawings is the model chosen by Gökhan. Which option A, B, C or D is the model that Gökhan has chosen?

A



B



C



D



MENU: Mr. Celal, who takes a glance at a menu, finds the information below;

Sautéed Meat: 263 Calories

Rice: 215 Calories

Yogurt: 99 Calories



1: If he eats all three, how many calories will he take?

2: Mr. Celal does not want to take more than 500 calories. What can you suggest to him to do?

Using Gamification as an ABL Tool for Teaching Marketing Research: A Practical Experience

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Abstract

Activity Based Learning (ABL) Process involves the use of activities to facilitate effective learning among students. This method is predominantly used in primary education, but in higher education due to time and other constraints teachers are not able to use the tool very widely. This paper shares a practical experience of using Gamification as an ABL tool for teaching Marketing Research – a Post Graduate level Business Management course. The paper aims to present the efficiency of Gamification, in this context used via a disguised market research technique, implemented for a course by the Post Graduate level teachers at Loyola Institute of Business Administration (LIBA), Chennai, India, for teaching Marketing Research course. The tool is in use at the institute for close to a decade and several attempts were made over the years to make improvements in the tool in order to make the teaching – learning experience innovative and exciting.

This paper will present a full note on the conception and evolution of the tool and experimental design with test and control groups is used to test the efficiency of the tool. Longitudinal study is used to provide evidence for reliability of the tool.

Keywords: *Activity Based Learning, Gamification, Marketing Research, Disguised Market Research, Higher Education, Innovation in education, Management Education.*

Introduction

Activity-Based Learning (ABL) is a instructional method that facilitates active engagement of students in the learning process through a set of activities and real-time experiences. ABL is proven to enhance understanding and retention of concepts. These activities normally include role-playing, simulations, group projects, games, interactive exercises etc.

ABL is a rigorous educational approach supported by various theoretical frameworks and empirical evidence. ABL is largely established in constructivist theories of learning, particularly the works of Jean Piaget (1936) and Lev Vygotsky (1962). Piaget's theory of cognitive development points out that learners build knowledge through collaborations with their surroundings. Vygotsky's concept of the Zone of Proximal Development highlights the importance of social interaction and scaffolding in learning. Research consistently shows that ABL is evidenced to increase student engagement and motivation. By participating in hands-on activities, students find learning more enjoyable and relevant (Prince, 2004). John Dewey's educational philosophy stresses the significance of familiarity in the learning process. Dewey (1938) argued that education should be grounded in real-world experiences and that learning occurs through a continuous interface between the learner and their environment. David Kolb's (1984) experiential learning theory is another foundational framework for ABL. Kolb posits that learning is a process whereby knowledge is created through the transformation of experience. His model involves a cycle of concrete experience, reflective observation, abstract conceptualization, and active experimentation.

Different forms of ABL

Project-Based Learning is a popular form of ABL where students work on projects over an extended period. Projects are often interdisciplinary and require students to apply knowledge to real-world problems (Thomas, 2000). In **Problem-Based Learning**, students are presented with a problem and must work together to find solutions. This approach encourages active inquiry and critical thinking (Barrows & Tamblyn, 1980). **Inquiry-Based Learning** involves students questioning, conducting investigations and building new insights. This method aligns well with STEM education (Edelson, Gordin, & Pea, 1999). **Experiential Learning** activities that include field trips, lab experiments, simulations, and role-playing exercises that provide direct experiences related to the subject matter (Kolb, 1984). Kurt Lewin introduced the concept of **Action Research**, which combines theory and practice through a recurring process of planning, acting, observing, and reflecting. Lewin's work emphasized the importance of experiential learning in promoting personal and professional development (Lewin, 1946).

Advantages of Activity-Based Learning

ABL has been shown to enhance retention and understanding of concepts in students – both in elementary and higher education. Studies indicate that students who learn through active engagement are able to have better retention ability compared to those who learn inertly (Hake, 1998).

ABL is proven to promote the development of critical thinking and problem-solving skills, especially those activities that require students to analyze, evaluate, and create foster higher-order thinking skills (Bonwell & Eison, 1991). In higher education, ABL has been found to enhance critical thinking and problem-solving skills. Prince (2004) conducted a review of the literature and concluded that active learning is beneficial across a variety of disciplines and educational levels. Most of the ABL activities involve group work, which helps students develop collaboration and communication skills. Working in teams allows students to learn from each other and practice interpersonal skills (Johnson, Johnson, & Smith, 1998).

Research conducted in STEM education shows that ABL significantly improves student performance and attitudes towards a wide range of courses in STEM disciplines. For example, a study by Hake (1998) demonstrated that interactive engagement methods in physics courses resulted in significantly higher learning gains compared to traditional instruction. A meta-analysis by Springer, Stanne, and Donovan (1999) found that small-group learning in STEM subjects led to significant improvements in academic performance.

Issues in ABL implementation:

ABL is a resource-intensive activity, requiring considerable time, materials and effort from the parts of both teachers and students. Organizational support for meeting the resource requirements and incorporating technology to simulate real-world experiences can help the instructors to largely address this challenge (Blumenfeld et al., 1991). Another big challenge for ABL implementation is the assessment method that could be used for evaluating the students. Conventional assessment methods may not effectively measure the outcomes of ABL. Alternative

assessment strategies such as rubrics, peer assessments, and portfolios can provide a more comprehensive evaluation of student learning (Boud & Falchikov, 2007).

Effective implementation of ABL requires adequate training and support for teachers. Faculty development programs and collaborative efforts can help teachers develop the necessary skills and confidence for implementing ABL (Darling-Hammond et al., 2009). Another biggest challenge facing ABL is that students may resist ABL due to unfamiliarity with such innovative learning methods. Gradual introduction of ABL activities and clear communication about the benefits can help mitigate resistance from the students' side (Felder & Brent, 1996).

Gamification as an ABL tool

Gamification is the process of the application of game ingredients in learning environments, which has emerged as one of the powerful tool in education in recent times. By effectively integrating game elements, such as strategy, surprise, skill, challenge, interaction, fun, constraints etc, gamification aims to enhance student engagement, motivation, and learning outcomes.

Self-Determination Theory (SDT) suggests that motivation is driven by the need for competence, autonomy, and relatedness (Deci & Ryan, 1985). Gamification addresses these needs by providing challenges (competence), allowing choice and control (autonomy), and fostering social connections through collaborative and competitive elements (relatedness).

Mihaly Csikszentmihalyi's Flow Theory suggests that people are highly engaged when they are in a state of flow, characterized by complete absorption in an activity (Csikszentmihalyi, 1990). Gamification can facilitate flow by balancing skill and challenge levels, providing clear goals, and offering immediate feedback. Positive reinforcement through rewards (points, badges) and negative reinforcement through penalties can shape and sustain desired behaviors during implementation of gamification (Skinner, 1954).

Advantages of Gamification in Education

Gamification can significantly enhance student engagement and motivation by making learning more enjoyable and interactive. Numerous studies demonstrate that gamification increases student engagement and motivation. For instance, Hamari et al. (2014) found that gamified learning environments lead to higher levels of student participation and enjoyment. A meta-analysis by Subhash and Cudney (2018) revealed that gamification positively impacts academic performance, particularly in terms of knowledge retention and skill acquisition. Students generally respond positively to gamified learning experiences. In a study by Domínguez et al. (2013), students reported higher satisfaction and perceived value in courses that incorporated gamification elements. Studies indicate that gamification fosters collaboration and social interaction. For example, Hamari et al. (2016) found that gamified learning environments promote teamwork and peer support, leading to improved learning experiences.

Using game elements such as points, badges, leaderboards etc., create a sense of competition and achievement, encouraging students to participate actively (Deterding et al., 2011). Research indicates that gamification can lead to better learning outcomes by providing continuous feedback, fostering intrinsic motivation, and encouraging persistence. Gamified environments can help

students develop a deeper understanding of the material and improve retention (Hamari, Koivisto, & Sarsa, 2014). Gamification often includes social elements such as teamwork and competition, which can enhance collaboration and social interaction among students. These interactions can lead to a more supportive and dynamic learning environment (Kapp, 2012). Gamified learning activities often require students to engage in critical thinking and problem-solving. By navigating challenges and making decisions, students develop these essential skills (Gee, 2003). Gamification provides immediate feedback, allowing students to understand their progress and identify areas for improvement. Adaptive learning pathways can tailor challenges to individual skill levels, ensuring optimal learning experiences (Baker et al., 2010).

Structuring learning activities as quests or challenges can make learning more engaging. This approach provides clear goals and a narrative context, making the learning experience more immersive and enjoyable (Gee, 2003). Designing courses with levels and progression systems can help maintain student interest and motivation. As students advance through levels, they experience a sense of accomplishment and are motivated to reach higher stages (Kapp, 2012).

Incorporating both collaborative and competitive elements can enhance social interaction and learning outcomes. Team-based challenges and competitions can foster a sense of community and drive engagement (Hamari et al., 2016). Game-Based Learning Platforms specifically designed for gamified learning can streamline implementation. Tools like Kahoot, Classcraft, and Duolingo offer ready-made gamification features that can be easily integrated into the curriculum (Bicen & Kocakoyun, 2018).

Challenges to implement Gamification as a learning tool

Gamification focusses more on the extrinsic rather than on the intrinsic rewards. Excessive focus on extrinsic rewards can undermine intrinsic motivation. Balancing extrinsic and intrinsic motivators and ensuring that rewards are meaningful can help address this issue (Deci, Koestner, & Ryan, 1999). Effective implementation of gamification requires careful design to ensure that game elements are educationally meaningful. Collaborating with instructional designers and using evidence-based practices can enhance the quality of gamified experiences (Deterding et al., 2011).

Ensuring all students have access to gamified learning tools can be challenging. Providing necessary resources and support, and designing inclusive activities, can help mitigate equity issues (Baker et al., 2010). Maintaining student interest in gamified activities over the long term can be difficult. Regularly updating challenges, incorporating student feedback, and varying game mechanics can sustain engagement (Hamari et al., 2014). Assessing the impact of gamification on learning outcomes can be complex. Using a combination of quantitative and qualitative methods, such as surveys, performance metrics, and reflective assessments, can provide a comprehensive evaluation (Domínguez et al., 2013).

Using Gamification in Management Education

Various studies have demonstrated the positive impact of gamification on student engagement and learning outcomes in management education. A study by Su and Cheng (2015)

found that gamified courses increased student motivation and participation compared to traditional teaching methods.

Simulated environments and role-playing games immerse students in realistic management situations. These activities enhance experiential learning by allowing students to practice decision-making and problem-solving in a controlled setting (Aldrich, 2009).

Long-term impact of Gamification

Longitudinal studies in management education track students' progress over months or years, offering insights into how educational experiences influence their development. This approach allows researchers to observe changes in competencies, attitudes, and behaviors, providing a comprehensive understanding of educational impact (Pascarella & Terenzini, 2005). These studies are also crucial for assessing the long-term effectiveness of specific educational interventions, such as curriculum changes, teaching methods, and experiential learning programs. By measuring outcomes over time, educators can determine the sustained impact of these interventions (Boyatzis & Saatcioglu, 2008).

Longitudinal studies basically use different data collection tools, like surveys, academic records, performance assessments, and self-reported measures. Technology advancements has enabled the use of digital tools and learning analytics dashboards to track students' progress over time (Kuh et al., 2011).

Longitudinal studies have shown that gamification can lead to sustained improvements in student performance and retention of knowledge. Barata et al. (2013) reported that students in a gamified management course outperformed their peers in subsequent courses, indicating lasting benefits. Longitudinal studies have shown that using gamification as a teaching tool in management education significantly contributes to the development of critical managerial skills. For example, studies have documented improvements in leadership, communication, and problem-solving skills over the course of MBA programs (Ruben, 1999).

LIBazaar: A real-time example of ABL tool in MBA education

Loyola Institute of Business Administration (LIBA) is a Business School based out of Chennai, India, which is one of the units belonging to the 150 years old Loyola College, Chennai. LIBA runs a 2-year PGDM programme (like MBA programme), the flagship programme. LIBazaar is an Activity Based Teaching, Learning and Assessment component that is blended into the course, Research Methods and Methodology which is offered in Term 3 of the PGDM full time program.

History of LIBazaar

In the 1980s, the part-time PGDM students of LIBA (at that time LIBA was offering only part time programmes) organised an annual bazaar (Bazaar is an Indian and Middle eastern term for marketplace that has a row of shops / stalls selling food and other consumer goods) by inviting

many major FMCG and retail brands in Chennai to put up stalls in LIBA campus. The event was promoted widely and attracted public from in and around Nungambakkam (CBD of Chennai city) area, where students conducted consumer research by collecting responses from the public. The research outcomes were presented as part of Marketing Research course. In the subsequent years, the bazaar event was stopped due to lack of time and motivation from the students to continue it.

The New Concept

In the year 2015, the students of full-time batch decided to re-start the bazaar due to the motivation given by the faculty member who handled the Research Methodology course. For the purpose, they thought that a new model, which is innovative and at the same time measurable could be used to conduct market research. They proposed to learn and apply the concept of Disguised Marketing Research – a qualitative and exploratory research method that helps to elicit unbiased responses and use gamification as a method to conduct disguised market research. The students wanted to have a unique brand name for the event blending LIBA and Bazaar. Thus, LIBAzaar was born. Stalls remain as the major attraction for LIBAzaar, apart from attractive cultural events which act as crowd-pullers. The stall space is generally dominated by the local and relatively new Food & Beverages (F&B) and Quick Service Restaurant (QSR) brands from the city. Each research project that is obtained from the companies are converted into games and students engage the target audience in games and collect data.

Teaching-Learning Process @ LIBAzaar

LIBAzaar is linked to the course – Research Methodology (Presently called as Research Methods & Methodology), a subject of great importance that is normally offered in the first year (Term 3) of PGDM full-time program at LIBA. The course is aimed to provide hands-on experience for students for conducting marketing research, to prepare them for Summer Internships. LIBAzaar activity is an Assessment Component in the course and carries a weightage of 30% and a total of 5 sessions (7.5 hours) is allocated for the activity. The process to be followed for conducting LIBAzaar is communicated to the students via course outline and a detailed discussion in the class.

The scope of LIBAzaar is restricted to understanding the exploratory research design where a qualitative tool like game is used for data collection. Students further their research using descriptive research design based on findings from LIBAzaar research

The following are the various phases involved in the teaching-learning process linked to the activity

- **Phase 1:** Students are divided into teams and are expected to identify companies – generally big brands that are ready to offer real-time research projects for LIBAzaar. A hard copy of the project offers letters received from companies should be submitted to the faculty member

- **Phase 2:** Students present a gamification plan to the faculty member for approval. Gamification is an important facet of Disguised Marketing Research, where critical outcome variables are investigated using a game.
- **Phase 3:** Research is conducted during LIBAazaar. Each team is expected to collect a minimum of 400 samples from LIBAazaar. Research is conducted in game stalls, which are strategically positioned in between other stalls.
- **Phase 4:** The findings from the research is presented in the class and a plan for a subsequent descriptive research design is discussed
- **Phase 5:** Students conduct descriptive research and present the findings of research to the company and faculty member

Assurances of Learning (AoL)

1. Understanding the exploratory and descriptive research designs.
2. Applying the concepts learnt in real-time business research situation.
3. Developing critical thinking and problem-solving skills.
4. Acquiring Negotiation, Leadership and Organising skills, which are critical for managers.
5. Applying Creativity and Innovation during Gamification.

Specific Learning Goals

1. **To conduct Disguised Market Research:** LIBAazaar has a dual positioning strategy. To the industry, it is positioned an innovative marketing research exercise done by PGDM students, while it is positioned as an annual marketing carnival to the public. LIBAazaar has the tagline – *Idhu Namma Chennai Thiruvizha (Meaning: This is our very own Chennai Festival)*. The objective is to ensure that the public are not aware that research is conducted during the carnival, to ensure that the objectives of disguised research are met.
2. **To develop promotion strategy:** The promotions for the event kick starts a month before the event date. Social media, Celebrity endorsement, Flash mobs, Radio promotions, posters, are used to promote LIBAazaar.
3. **To prepare an event plan:** To attract public, stalls alone may not be sufficient, so a big line up of events is planned throughout day to draw the general public to the event. Drawing Competition (Target Segment – Children and Parents), Celebrity Walk-ins (Target Segment – Teenagers and youth), Bike Show, Dance Competition, Fashion show, Stand-up comedy etc (Target Segment – Youth and family).
4. **To develop sales pitch:** Students approach companies for sponsorship. There are different sponsorship plans – Title Sponsorship, Co-Sponsorship, Affiliate Sponsorship, Event Sponsorship etc at different price points.
5. **To prepare a revenue plan:** Students generate income from Stalls and Sponsorships. Students also present budget as part of their research proposal to companies. Most of the

companies that offer research projects provide research fund for the purpose of conducting research.

Assessment Method

Students are assessed over three aspects: Project, Gamification and Research. A detailed orientation is given to the students 3 months before the start of the course, so that students get enough time to approach companies for projects. Students are encouraged to get research projects that focus on broad areas like consumer perception, consumer satisfaction brand awareness, product testing etc, where gamification could be used a data collection tool. Students are assessed based on aspects such as: type of the company, nature of product, depth of the project, ability to convert the project into a full-blown descriptive research, ability to convert the project into live internships, stipend offered for the project etc.

The uniqueness and efficiency of the games used for data collection is assessed using a set of pre-determined rubrics, which is communicated to the students through the course outline and discussion forums from time to time. Gamification tool is assessed using aspects such as: uniqueness of the tool, ability of the tool to engage the target segment, design aspects of the games etc.

The research part is assessed based on aspects such as methodology used, sampling design, questionnaire design, data analysis etc.

Research Methodology

Effectiveness of the tool was measured using the experimental design with test group as PGDM full time (indicated with 'F' followed by year) students and control group as PGDM part-time students (Indicated with 'P' followed by year). Both the programmes are approved by the AICTE (All India Council for Technical Education – the apex body in India for approving technical and management programmes) and have same syllabus, engagement hours, pedagogy. The faculty member is the same for both the groups. While LIBAazaar is conducted only by PGDM full time students, it is not included in the course for part time students. A tailor-made construct was used to measure the effectiveness with a 5-point scale. The study was conducted for five batches from F16 / P16 onwards till the recent batch (2022). Batches F19, F20 & P19, P20 were not included for research since LIBAazaar was not conducted in the year 2021 due to COVID. The full-time programme runs for 2 years / 6 terms, while the part time programme is for 3 years/ 9 terms. The total credit hours are 126 for both the programmes The full-time students do the course in Term 3 of their first year and the Part Time students are typically offered this course either in Term 3 or Term 4. There are 180 students in full-time and 60 students in part time every year.

Findings from the Research

Scores for each statement on a 5-point scale is given below

Year / Mean Score Statements	2016		2017		2018		2021		2022		AVG	
	F16	P16	F17	P17	F18	P18	F21	P21	F22	P22	FT	PT
I am able to remember most of the concepts taught in the course	4.1	4	4.1	3.9	4	4	4.2	4	4.2	4	4.12	3.98
If asked to take up a test now, I think I will be able to score as much as I had scored when I did the course	4	3.7	4	3.6	3.9	3.8	4	3.8	4	3.7	3.98	3.72
I am able to recall almost all the examples and case studies done during the course	3.8	3.6	4	3.6	4	3.6	4.1	3.7	4.1	3.8	4	3.66
I am able to remember the title of the project done by my team as part of the course	4.5	4.3	4.4	4.3	4.3	4.3	4.5	4.3	4.6	4.3	4.46	4.3
I am able to recall the methodology used in the research projects done by my team	4.1	3.9	4	3.7	4	3.6	3.9	3.9	4.1	3.9	4.02	3.8
I will be able to summarise the team project that we did for the course	3.9	3.9	4	4	3.8	4	4.1	3.9	4	3.9	3.96	3.94
I will be able to explain most of the concepts learnt with suitable examples	4.1	3.7	3.9	3.6	4	3.8	4	3.6	4.2	3.9	4.04	3.72
I will be able to apply the concepts learnt in real-time situations	4.2	3.8	4.2	3.7	4.1	3.8	4	3.7	4.1	3.8	4.12	3.76
I know how to conduct data collection using questionnaire and other data collection methods	4.2	3.8	4.2	3.7	4.1	3.8	4	3.7	4.1	3.8	4.12	3.76
I will be able to choose the right sampling technique, given the population and the problem identified	4	4	4.1	4	3.9	3.8	4	4	4.2	4	4.04	3.96
I will be able to analyse and interpret the data collected using the statistical software taught during the course	4	3.7	4	3.8	4.1	3.8	4.1	3.9	4.2	3.7	4.08	3.78
Mean value	4.08	3.86	4.08	3.81	4.02	3.85	4.08	3.86	4.16	3.89	4.09	3.85

Major Findings

The course is assessed at K4 level (Analyse) in Blooms Taxonomy. Out of the 11 statements in the scale, the first 6 are in K1 / K2 levels and the rest are at K3/K4 levels. Paired t-test conducted between F batches and P batches yielded the following results for:

Ho: There is no significant difference in the K1/K2 and K3/K4 levels between F and P batches

YEARS	HO ACCEPTED / REJECTED K1/K2	HO ACCEPTED / REJECTED K3/K4
2016	REJECTED	REJECTED
2017	REJECTED	REJECTED
2018	ACCEPTED	REJECTED
2021	REJECTED	REJECTED
2022	REJECTED	REJECTED
OVERALL	REJECTED	REJECTED

Data Analysis done using MS Excel software showed that Ho is rejected in all the cases except in K1/K2 level for year 2018, where there is no significant difference existing between F and P batches. Ho is also rejected for both K1/K2 and K3/K4 levels overall, showing that there is significant difference existing between F and P batches, leading to an interpretation that gamification and ABL has resulted in higher efficiency at K1/K2 and K3/K4 levels in the students.

For further validating the results, the same questionnaire was sent out to F14, F15 and P14, P15 batches, where the F batches did not have experience of LIBAazaar. The data was collected in the year 2017 from 71 F batch students and 54 P batch students, where it was found the Ho is accepted for all the K levels, showing that the batches did not show any significant difference between them as regards learning outcomes from the course.

Conclusion

As literature indicated, ABL results in improved efficiency in MBA students. Gamification is an innovative ABL technique, which can be used in higher education, and it is proven to engage students better for improved achievement in learning outcomes. However, constraints like time, resource and willingness plays an important role for implementation of Gamification as a learning tool. Good planning and monitoring can ensure effective implementation of ABL as a teaching-learning tool in higher education.

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Exploring the Effectiveness of Asynchronous Guided Mindfulness Videos as a Mental Health Intervention in Post-Secondary Students: A Cross-Cultural Analysis

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Abstract

The mental health crisis among post-secondary students, particularly in Canada, has become increasingly alarming. This study explores the potential of asynchronous guided mindfulness videos as a potential mental health intervention for such students. The COVID-19 pandemic has exacerbated students' stressors and prompted the need for innovative mental health support programs. While the online learning environment increases the students' stress on their academic work, asynchronous learning offers flexibility for students. The asynchronous mindfulness practice could offer students flexible mental health support. The study explores whether asynchronous mindfulness videos help with stress reduction. It also examines why individuals engage in them, considering both Western and Eastern cultural contexts. Thematic analysis of YouTube (Western culture) and Bilibili (Eastern culture) comments reveals predominantly viewers' positive reactions to asynchronous guided mindfulness, indicating its effect on stress reduction and emotional stability. Viewers engage in these practices to mitigate chronic stress, and cultural differences influence the reporting of somatic and emotional experiences. While both platforms share similar themes, micro-level differences suggest varied responses to asynchronous guided mindfulness practice. A Chi-square analysis demonstrates significant differences in thematic frequencies, emphasizing the need for culturally sensitive approaches. The findings suggest the importance of tailoring interventions to cultural differences and incorporating them into mental health support programs. This research contributes to the ongoing discourse on mental health interventions for post-secondary students, promoting the potential of asynchronous guided mindfulness videos in promoting well-being across diverse cultural backgrounds.

Keywords: *Mindfulness, Asynchronous, Post-Secondary Students, Stress Reduction, Cross-Cultural Analysis*

1. Introduction

The mental health crisis among Canadian post-secondary students has reached alarming levels in recent years (Moghimi et al., 2023). Sadly, this issue was brought to the forefront by the suicide of three University of Toronto (UofT) students who jumped off a building in 2019 (Nasser, 2019). Unfortunately, this is not a one-time occurrence; another UofT student commented suicide in 2020 (Wong, 2023). These tragic incidents emphasize the pressure and stress many students face daily. To prevent further tragedies, we need to prioritize mental health services for post-secondary students and create a supportive environment that promotes well-being (Thurber & Walton, 2012).

The COVID-19 pandemic has added to the existing stressors, forcing students into virtual classrooms and creating an isolated environment that could be highly stressful, especially for newcomers unfamiliar with their new environment. (Bolatov et al., 2020; Wang, 2023); many do not have a chance to meet new friends or classmates due to online learning, which increases the sense of isolation and stress (Wang, 2023). Studies showed that all grade students have increased mental health risks during the pandemic (Bolatov et al., 2020; Wang, 2023). Social distancing

policies further inhibited students from seeking in-person psychological help, making it important to study alternative interventions.

Despite these challenges, the transition to online learning also offers advantages. Both online learning formats, synchronous and asynchronous, share the advantage of flexibility (Fabriz et al., 2021; Muller & Mildenerger, 2021); especially, asynchronous courses offer instructors and learners flexible time and locations to teach or learn content (Jensen et al., 2022). This flexibility can be beneficial in designing new mental health interventions for stressed students, allowing them to fit the intervention into their schedules. Furthermore, with the improvement of asynchronous course delivery methods during the pandemic, most students are now accustomed to this learning style.

To serve the diverse student population in Canadian post-secondary institutions, it is essential to consider cultural diversity (Ouellet & Crawley, 2024). International students face unique stressors related to cultural differences (Koo et al., 2021; Su et al., 2021). Specifically, acculturative stress arises from the process of adapting to a new culture (Kristiana et al., 2022; Su et al., 2021). The need to adjust to different social norms, language barriers, and academic expectations can lead to significant psychological strain (Li & Peng, 2019; Su et al., 2021). Since the primary challenge for international students lies in cultural differences, the designed intervention should have similar experiences to students with various cultural backgrounds. With that, mindfulness could be a promising intervention for students since research supports that people have similar experience with it and its effectiveness in stress reduction across various cultures as an in-person intervention (Ivtzan et al., 2017; Tran et al., 2014).

Also, mindfulness has been empirically shown to be an effective stress reduction technique (Kriakous et al., 2020). By focusing on the present with a nonjudging attitude, individuals can observe the stressors without reacting to them, increasing emotional stability (Osborne & Atkinson, 2022). Therefore, mindfulness can be a promising intervention for Canadian post-secondary students with large groups of international students.

Given the effectiveness of in-person mindfulness and the flexibility of asynchronous online courses, this study explores the potential of asynchronous guided mindfulness videos as a mental health intervention. This exploratory study aims to investigate public reactions to asynchronous guided mindfulness videos posted on YouTube and Bilibili, representing Western and Eastern cultures, respectively. To do so, the current study aims to analyze the collected comments from the chosen asynchronous guided mindfulness videos that were posted on popular video websites (Andel et al., 2020; Liu et al., 2023), including YouTube, the video platform for Western culture; and Bilibili, one of the most popular video websites in China, representing Eastern culture (Liu et al., 2023). Also, analyzing content from video comments can contribute to the understanding of viewers' attitudes toward the video, and some comments would involve some self-disclosure that can also benefit the investigation of the current study (Andel et al., 2020; Liu et al., 2023).

We wish to answer three research questions in this study. 1. Is asynchronous mindfulness effective in stress reduction? 2. Why and when do people engage in using online videos to practice mindfulness resources? And 3. Are there any cultural differences in the practice experiences

between Western and Eastern cultures? As this is an exploratory study, we do not have enough empirical evidence to construct specific hypotheses for each research question. We wish to address the research questions innovatively in a more open-ended manner.

2. Methods

This research compared asynchronous guided mindfulness comments from two distinct cultures that are available on YouTube and Bilibili platforms. Our analysis focused on archival data extracted from the comments of the chosen videos, allowing for a direct comparison. The methodology process is presented in Open Science Framework³ (OSF).

2.1 Population - The population for this study consisted of viewers who commented on asynchronous guided mindfulness on YouTube and Bilibili platforms. The specific videos were selected based on predefined criteria to ensure consistency in content and purpose. The total number of comments analyzed was 862, with 524 comments from YouTube and 338 comments from Bilibili.

2.2 Materials - Three video was selected from each platform. The selection criteria included the following: First, the videos had to be guided mindfulness videos with the instructor's voice and a similar background music genre. Second, the videos had to be the same practice topics for stress reduction or relaxation. Third, the videos' length had to be similar. Fourth, videos posted during January 1st - December 31st, 2021, to control for timing effects on views and comment counts.

2.3 Procedure -

Step1 - Video Selection: Three videos related to asynchronous guided mindfulness were selected from each platform (YouTube and Bilibili) based on the predefined criteria.

Step2 - Data Collection: Comments and commenter IDs were retrieved using the Application Programming Interfaces (APIs) provided by YouTube and Bilibili. The collected comments were merged and saved in two separate Excel files, each representing one of the platforms.

Step 3 - Translation and Filtering: Three bilingual reviewers translated Mandarin comments from Bilibili into English. A back-translation process was also included to ensure translation accuracy. Short and non-informative comments, such as "wow," were excluded.

Step 4 - Thematic Data Analysis: A thematic analysis was conducted on the filtered comments by the primary researcher, involving the following steps:

1. Familiarization: The primary researcher read each comment to understand its content and noted initial thoughts and ideas.
2. Coding: Essential codes were generated based on the familiarization notes to answer the research questions

³ Open Science Framework <https://osf.io/smbnt>

3. Coding: Essential codes were generated based on the familiarization notes to answer the research questions.
4. Theme Searching: Similar codes were combined to form broader themes, allowing for visualization and comparison of relationships between different themes.
5. Reviewing Themes: Each theme was reviewed to ensure the accurate assignment of codes.

Step 5 – Inter-rater Reliability: After the initial thematic analysis by the primary researcher, two additional independent raters, each trained in qualitative content analysis, were involved in the coding process. The raters were provided with a predefined coding framework. Each rater independently generated and applied their own codes to the same set of comments from both platforms (O'Connor & Joffe, 2020), focusing on the specified themes. The interrater reliability was assessed using Fleiss' Kappa, an extension of Cohen's Kappa designed for use with more than two raters (McHugh, 2012). This measure evaluates the level of agreement among raters, specifically assessing whether all raters consistently applied codes to the same theme for each comment.

Step 6 - Quantitative Analysis: The number of codes in each theme from both platforms was calculated. The difference in code numbers across the themes from the three raters was discussed, and the agreed-upon codes were considered as the final code counts. A chi-square test of independence was conducted to compare the final code frequencies in themes between YouTube and Bilibili comments. Post hoc analysis was performed with Bonferroni correction to control for multiple comparisons

3. Results

3.1 Thematic Analysis -

A total of 524 YouTube and 338 Bilibili comments were kept after preliminary filtering for the study analysis. The thematic analysis identified five central themes from both platforms' comments. See OSF link for the frequency table and the related codes of each theme. These themes are:

1. Somatic Experience During/After Practice (*Somatic theme*): This theme includes reports of physical reactions to asynchronous guided mindfulness practice.
2. Emotional Experience During/After Practice (*Emotional theme*): This theme is defined by the emotional experiences viewers shared during or after the guided mindfulness practice.
3. Frequency of Meditation (*Frequency theme*): This theme encompasses comments about how often viewers engaged in mindfulness practices.
4. The Outcome of Mindfulness in Life (*Outcome theme*): This theme includes comments where viewers shared perceived changes post-practice.
5. Self-Disclosure of the Immediate Situation Before Practicing (*Self-Disclosure theme*): This theme records the situations that prompted viewers to engage in mindfulness videos.

3.2 Difference in Themes Between the Two platforms

After identifying the five themes, we then conducted a chi-square test of independence to compare the frequencies of the themes from YouTube and Bilibili. The chi-square test revealed a

significant result, χ^2 (20, N= 862) = 159.59, $p < .001$, an overall significant difference in the frequency of themes across the two cultural contexts. Post hoc analysis, however, revealed that after applying the Bonferroni correction to control for multiple comparisons, none of the individual themes showed a statistically significant difference between cultures at the adjusted alpha level (all adjusted p-values $>.05$). Despite the lack of significant findings from the Bonferroni corrected post hoc tests (more on the post hoc analysis in the discussion section), standardized residuals identified *three key themes: Somatic theme and Emotional theme*, as well as the *Outcome theme*. These themes showed differences between observed and expected frequencies, suggesting that mindfulness practices might evoke culturally distinct somatic and emotional responses and lead to varying positive outcomes. Next, we will present more detailed results on the *three key themes*.

3.3 Somatic Experience During/After Practice (*Somatic theme*)

Fleiss' kappa showed that there was great agreement in raters, $\kappa = .97$, 95% CI [0.97, 0.98], $p < .001$. Compared with the total comments on each site, the theme had a notably high proportion of comments on Bilibili (51%) as opposed to YouTube (23%). The standardized residuals indicated this difference was significant, contributing to the chi-square result. This suggests a more pronounced expression of physical or emotional sensations in the YouTube comments compared to Bilibili. However, both platforms have comments reporting crying during or after the practice, with 25% from the YouTube comments and 48% from Bilibili comments. While most YouTube comments reflect better somatic feelings (34%), Bilibili had a lower percentage of comments related to this feeling (10%). Other shared comments like, the sleepy feelings might suggest the relaxed feeling that the asynchronous guided mindfulness practice arouse. However, the negative feelings suggest the practice might not be suitable for all viewers from Bilibili (4%) and YouTube (3%). (See OSF link for more somatic experience)

3.4 Emotional Experience During/After Practice (*Emotional theme*)

This theme displayed very good agreement among raters, with $\kappa = .87$, 95% CI [0.86, 0.88], $p < .001$. Emotional reactions were reported by 66% of YouTube commenters and 42% of Bilibili commenters. The most common emotional experiences on YouTube were feelings of relaxation (27%) and calmness (27%). Bilibili commenters also reported calmness (19%) but had a lower percentage of relaxation (11%) comments. Both platforms had no negative emotions reported. Other feelings were found and presented in OSF link.

3.5 The Outcome of Mindfulness in Life (*Outcome theme*)

This theme showed very good agreement among raters, with $\kappa = .84$, 95% CI [0.82, 0.85], $p < .001$. While the comments reflected on this theme were less than the previous themes, Bilibili had a higher percentage of comments (9%) than YouTube (8%). The most common outcomes of mindfulness were more optimistic (31%) and self-love (24%) on Bilibili. Some believe that they feel more in control over their lives and a reduction in self-criticism. Also, YouTube viewer shares

that they think mindfulness practice helped them start their day (33%) and helpful in general (48%). Viewers from the two platforms reported all positive outcomes after the practice.

3.6 Frequency of Meditation (*Frequency theme*)

This theme showed very good agreement among three raters, with $\kappa = .91$, 95% CI [0.90, 0.92], $p < .001$. Comments related to the frequency of meditation were slightly higher on Bilibili (15%) compared to YouTube (13%). On Bilibili, viewers reported practicing asynchronous guided mindfulness daily (31%) and maintaining long-term commitment (31%). YouTube viewers indicated a long-term commitment to continuous practice (35%) and repeated practicing (37%).

1.10 Self-Disclosure of the Immediate Situation Before Practicing (*Self-Disclosure theme*)

This theme showed very good agreement as well, with $\kappa = .85$, 95% CI [0.83, 0.86], $p < .001$. Self-disclosure comments were relatively similar across platforms, with 21% on Bilibili and 23% on YouTube. Common reasons for engaging in mindfulness included anxiety (23% from YouTube; 13% from Bilibili), insomnia (17%) from Bilibili, and psychological issues (18%) from YouTube. (See OSF for other reported situations)

4. Discussion

Overall, careful qualitative thematic coding, with the support of high inter-rater reliability in each theme and through quantitative chi-square analysis, the present exploratory study is confident in summarizing the themes and able to answer the research questions with the following conclusions. Three key findings are revealed from the result.

1. *Somatic and Emotional Themes*: Both YouTube and Bilibili comments predominantly reported positive somatic and emotional experiences, indicating the effectiveness of asynchronous guided mindfulness in eliciting stress-reducing responses.
2. *Cultural Differences*: Differences in *somatic* and *emotional* reporting, as well as the *Outcome theme*, suggest the need for culturally sensitive approaches to mindfulness interventions.
3. *Engagement Reasons*: Viewers engaged in asynchronous guided mindfulness videos primarily to manage stress and anxiety, with both platforms reflecting similar motivations for practice.

4.1 Objective 1: Is asynchronous mindfulness effective in stress reduction?

Results from our thematic analysis support the statement that asynchronous guided mindfulness is effective in reducing stress and promoting mental health. This conclusion is grounded in the observations that most comments from YouTube and Bilibili reported positive somatic or emotional reactions to the practice. Specifically, viewers' reports of relaxation, calmness, and sleepy feelings suggest that guided mindfulness practices are effective in eliciting responses that correlate with stress reduction. It aligns with previous empirical studies that found the connection between the reported emotional and somatic responses and reduced stress and

burnout levels. Janssen et al. (2018) found that after in-person mindfulness, participants reported feelings of calmness and reduced stress measured by the Perceived Stress Scale (PSS) and the Maslach Burnout Inventory (MBI). The PSS measures perceived stress levels, and the MBI is used to assess burnout, including emotional exhaustion (Janssen et al., 2018). These findings are crucial as they reflect the potential of asynchronous guided mindfulness to facilitate emotional regulation and enhance physical relaxation, directly impacting stress reduction.

Furthermore, there were very few to no negative reports across the five themes. Thus, there is minimal evidence that suggests the disadvantages of asynchronous guided mindfulness. However, further investigation is required to determine whether the stress-reduction efficacy of asynchronous guided mindfulness is comparable to that of in-person sessions.

4.2 Objective 2: Why and when do people engage in using online videos to practice mindfulness resources?

We concluded that people engage in asynchronous guided mindfulness to alleviate chronic stress and as an ongoing coping mechanism for stress management and mental well-being promotion. From the *Self-Disclosure* theme, many comments expressed a desire for stress management and emotional relief, as viewers disclosed issues like anxiety, stress as their practice motivators. This indicates that individuals are turning to guided mindfulness in search of coping mechanisms for their stressors. Results from the *Outcome* theme also provided critical insights into the answer of this objective. The most frequent outcomes included becoming more peaceful, self-loved. These positive outcomes could be the goal or motivating factors of participation in online mindfulness practices. The *Frequency* theme also revealed that people would constantly engage in the practice as an antidote for their experience of negative mood. This conclusion also echoes the idea that mindfulness-based are effective for stress reduction.

4.3 Objective 3: Are there any cultural differences in the practice experiences between Western and Eastern cultures?

On a macro level, both online mindfulness experiences from Western and Eastern platforms consist of the same five key themes. Both comments from Bilibili and YouTube had most of the comments reporting positive experiences (e.g., feeling calming) and outcomes (e.g., feeling more in control). The positive outcomes and decrease in negative emotions that were mentioned in the video comments align with the Ivtzan and colleagues' (2017) cross-cultural study, in which both Hong Kong and British participants showed an improvement in negative emotions and self-love after mindfulness practices.

On a micro level, we do see differences between the two cultures. For somatic experience, viewers from Bilibili tend to report more crying reactions than viewers from YouTube. For self-disclosure comments, situations described under YouTube comments are more descriptive and immediate, such as the loss of cats; self-disclosures from Bilibili share situations that are more general and long-term, such as chronic anxiety. For the *Outcome* theme, Bilibili viewers are more likely to share their understanding after the practice, while only one YouTube viewer mentioned

the post-practice feelings. These micro-level differences shed light on the cultural mechanism of responding to mental health interventions. To provide effective services to all students on campus, future studies can dive deeper into this topic.

4.4 Implication

This study's results illustrate the effectiveness of asynchronous guided mindfulness courses and strongly support the plausibility and potential of implementing them in schools to promote mental health in post-secondary students. First, asynchronous video has been shown to positively affect participants' mental well-being. This shows that although in-person mindfulness content is reconfigured into an online format, its effectiveness is evident. However, whether the two delivery methods have statistically indistinguishable potency requires more studies.

Second, the asynchronous guided mindfulness practices offer a flexible and readily accessible form of stress relief, particularly valuable for post-secondary students with demanding schedules. As reflected in the viewers' comments from the study, students can conveniently engage in mindfulness exercises at their own pace and time (see OSF link). Many viewers engaged in mindfulness before sleep, a routine that might not be feasible with live sessions. Asynchronous mindfulness practices eliminate such barriers, allowing students to incorporate these exercises seamlessly into their daily lives, even in the quiet moments before bed, without the constraints of scheduled appointments.

Third, another advantage of asynchronous learning is the reduced pressure for immediate interaction, which fosters a sense of ease and contributes to a learning environment where students feel safe to express emotions and physical sensations related to their studies. This environment facilitates the emotional and somatic reactions that many students often report. Additionally, the privacy provided by asynchronous settings, which do not require real-time discussions, may empower students to freely share and reflect on their experiences and reactions without the concern of immediate peer or therapist judgment. For example, in psychotherapy, client resistance often occurs when individuals feel insecure about openly expressing their feelings (Westra et al., 2012). However, students in an asynchronous environment may feel more secure, which can be instrumental in helping them express repressed emotions. This setup not only enhances their learning experience but also supports their emotional well-being.

The findings also provided insights into the future development of the online mindfulness curriculum. For example, because practitioners' somatic reactions are frequent, such as crying, warnings or aftercare through psychoeducational lectures also need to be integrated into the intervention. Also, the mindfulness videos can be delivered purposely. For instance, teachers can deliver practice videos to students during exam seasons, which are characterized by excessive stress. Asynchronous guided mindfulness can calm students down and help with stress-related insomnia, which some comments mentioned (see OSF link).

5. Limitations

Although the current study offers valuable insights into the experiences of individuals who engage in asynchronous guided mindfulness practices across cultural contexts, it is worth noting

that there are several limitations to consider. For one, the reliance on viewer comments from YouTube and Bilibili for thematic analysis introduces a potential bias, as it only captures the perspectives of those inclined to share their experiences online. This may overlook a significant portion of mindfulness practitioners and introduce a self-selection bias. Additionally, the interpretation challenges inherent in textual analysis, such as misunderstandings of underlying meanings or cultural references, may impact the authenticity of the themes identified.

6. Future direction

To build upon the insights gained from this study on asynchronous guided mindfulness techniques, it is recommended that future research should address the study's limitations and explore the lasting effects and broader applications of these practices. Two critical paths for further investigation exist: conducting longitudinal studies and incorporating advanced and diverse research methodologies. First, longitudinal studies could track the progress of individuals over time, revealing how the benefits of mindfulness evolve, including changes in stress levels, emotional well-being, and somatic experiences. This approach would help understand the sustainability of positive outcomes and provide insights into the implementation of mindfulness practices in post-secondary settings.

Second, incorporating advanced research methods, such as in-depth interviews, would provide a more comprehensive understanding of participants' experiences. It can help uncover personal motivations, challenges, and transformative moments in mindfulness practice.

7. Conclusion

In conclusion, we investigated the effectiveness of asynchronous guided mindfulness videos as a mental health intervention for post-secondary students, examining their impact on stress reduction, the reason for people to engage in them, and exploring cultural differences in engagement. The research used comments from mindfulness videos posted on YouTube and Bilibili to analyze viewers' responses. The findings suggest that asynchronous mindfulness practices reduce stress and promote well-being, as evidenced by the mainly positive reactions across Western and Eastern cultural contexts. People engage in these resources when having negative emotions.

8. Acknowledgement

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Beauty as Metonym for Integrative Learning – a Personal Reflection on Teaching in Dark Times

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Abstract

Integrative learning is increasingly recognized as a valuable learning outcome for undergraduate experience. In reflecting how I have facilitated integrative learning in my teaching, I find translating it into a metonym conducive to motivating students to actively pursue such a quality in their own ways. I propose beauty as a metonym for integrate learning because it is at once a common human condition but also one that is contentious enough to necessitate pluralistic modes of engagement. Using beauty as a metonymic device can mitigate the hold of policy language on students' learning experience and facilitate more pathways with which students can consolidate ownership of their learning. I also argue that beauty as a metonym for integrate learning facilitates better teaching by bringing into proximity teachers' intellectual inquiries alongside students', a measure that prevents fragmentation and isolation of either.

Keywords: *integrative learning, general education, beauty, contemporary art*

It was nearing the end of the semester. With students' final papers laying open on my computer screen alongside the assessment rubric, I was at once yearning to be pleasantly surprised, while expecting to find new patterns in students' thinking that serve as a report card of my performance as a teacher. I am well aware that this report card metaphor overly simplifies the relation between teaching and learning: where teaching matters and how learning shows to settle. This realization does not free me from the anxieties of failing to teach well. I cannot afford to dismiss students' writings as not only artifacts for us to measure their performance, but also, arguably more importantly, for us to reflect on our own strengths and inadequacies.

One pattern from a recent semester had been the use of the word "combine". Students frequently coined the term when they wanted to explicitly show they had discovered relations between ideas in assigned readings in the course. What remained lacking were analyses of the kind and quality of relations they found, and their implications of such acts to cross and return. When to "combine" is taken as literally an act of placing in print one thing next to another, one ought to doubt what kind of learning for intellectual growth is involved, if at all. But might students' use of the term symptomatic of my failure to communicate what teachers articulate as "integrative learning"? If to combine is to bring together, integration tends more towards the purpose of combining to bringing out wholeness as the integrity of knowledge and the experience of learning in a student's life.

Much contemporary scholarship has argued for the salience of integrative learning in undergraduate education as a response to the fragmentation of students' learning experience. (Boyer & Levine, 1981; Graff, 2003; Huber & Hutchings, 2004) While there is no single definition over what it is, nor is there a consensus of what makes it challenging to teach and learn, there is the recurrent emphasis on integrative learning as a capacity for students to make connections of their learning experience on their own. In this sense, integrative learning for students is not integration for policy coherence on the course or programme level, nor on the university's institutional level about *campus-wide* initiatives. Integrative learning for students also contests the language of *transfer* as in "transferrable skills", which pertains to the repetition of models and their application, not what might lie beyond the models. My purpose in this paper is not to evaluate the multiple accounts of what integrative learning might be. Instead, I am interested in the gap between teachers' vocabulary and students': when students describe what they do as combining, they are cutting and pasting quotes and claims into the linear format of writing. It is not the kind of integrative learning we hope to see: a cognitive experience that critically and reflectively juxtaposes one thinker's idea with another in order that commonalities, conflicts, and potential communion can be formulated as a new kind of inquiry.

Another way of putting this is, while as teachers, we are excited to see integrative learning happening, students are not adequately led to relate this excitement to their academic life. Integrative learning is for them another demand they see from us, to be taken up as a task. bell hooks addresses the significance of "*excitement in higher education*" in *Teaching to Transgress* (1994, p. 7) and offers a succinct reminder: "*excitement about ideas was not sufficient to create an exciting learning process. As a classroom community, our capacity to generate excitement is deeply affected by our interest in one another, in hearing one another's voices, in recognizing one another's presence.*" (1994, p. 8) To think of "combination" as if it were the product specification of "integrative learning" is different from to think through what integration for the purpose of wholeness in the learning process involves.

It is evident to me that to re-state and re-affirm the value of integrative learning by positioning it in a vertical relation to such thinking skills as comprehending, evaluating, analysing for the purpose of intellection and argumentation may not suffice for students who are making sense of what they are doing, not only of what we want them to be doing. Vertical thinking is valuable in that it directs itself to advancement, but it could also miss other ways that thinking moves and matters. Students may be served better by being inspired by a different vocabulary that makes integrative learning strange, curious, and exciting. I think of the literary figure of metonym that might mitigate the hold of our language on their formative experience of learning. I propose to make a case for beauty as metonym of integrative learning.

Beauty as a metonym for integrative learning allows for integrative learning to be regarded in a different light. A metonym compels a leap of thinking so that we move quickly from theory

and policy to practice. It preserves the value, while also provides for the temporary suspension and intellectual distance, from established systems of knowledge. Thinking through a metonym ignites cognitive experiences, but in such a way that one is compelled to think their own minds. Students have to become active in figuring out what the metonym is and forging a relation with it. A metonym that does not replace but complements and mitigates policy language. It free students from taking up the quality of their learning as yet another point on the checklist to knock off as a task, to fulfil graduation requirement.

A metonym directs attention to a focus, but remains open and accessible as not only belonging to the institution or a policy. It allows for formality to be in touch with real life thinking. It is more likely students are motivated to find the connections that matter the most to them at a distance from our teaching plan. A metonym gives a sense of orientation and direction as to where to look, but not a standardized answer or result. It translates what researchers call trans-disciplinary practices, our collaborative research as goal of collaborative expertise to the process and reality of students' learning.

I have reasons to argue for beauty as a metonym for integrative learning on the students' part. In general, beauty has the potential of uniting what teachers present as learning activities and events during a course into a quality that marks teachers' and students' intellectual inquiries as a whole, as potentially equally valid and mutually constituted. Beauty as a metonym for integrative learning is more likely to bring about what bell hooks terms "*engaged pedagogy*," a process that "*helps establish the integrity of the teacher, while simultaneously encouraging students to work with integrity*" (1994, p. 21) with "*wholeness*" being the root meaning of the term integrity.

More specifically, beauty as a metonym for integrative learning works to crystalize students' learning experience. First, beauty is accessible not only through will and *intention*, which scholarship on integrative learning tends to emphasize. Instead, it requires *attention* of the artistic kind. In my teaching, as I prompt beauty as a set of questions with works of contemporary art, authors that students read in the syllabus are regarded as paying artistic attention to the subjects of their interests comparable to the way artists think. One account of artistic attention is that it involves "*extreme energizing and governance of instinct, for the ordered enlistment of intuition*" which George Steiner says marks the artist. (1989, p. 12) It takes into account details as much as some picture of the whole (artistic work, be it object or non-object-based), that demonstrates how thinking moves (even when it does not claim to know in a verifiable way), that more dynamically captures what richness learning can offer.

Second, beauty presents itself on the one hand as a common notion of the human condition while at the same time controversial. As Elaine Scarry argues, "*Beauty always takes place in the particular, and if there are no particulars, the chances of seeing it go down.*" (1999, p. 18) To engage with beauty necessitates healthy scepticism. While beauty can be defined by specific

disciplines as art history, theory of aesthetics, philosophy etc., it is also open enough to preserve the necessity of pluralistic methods of engagement and inquiry. It is in this sense that in the structure of thinking beauty is the potential of failing to find or access it. It foregrounds the fragility of thinking that can contest and mitigate the pressure that worshipful regard of policy imperatives exerts on how to measure the success of learning. This quality of beauty is arguably one challenge that further research on its relation to integrative learning is to encounter: how to capture a sense of what beauty is in a singular experience and whether the retrospective lens of research could ever catch up with the experience. To regard a quality as singular does not, however, preclude the identification of patterns of its occurrence. It is also in this attention lent to students' process of learning that makes beauty as a metonym a bridge between our language as teachers and students'.

Third, beauty is a necessary reduction of integrative learning. Gerald Graff argues "*Since beginning students need reductive simplifications before they can move on to the complications of a text, an issue, or a field, the pressure on academics to avoid being reductive, to eschew sound bites, to complicate as much as possible and at all times, clashes with the interests of good teaching.*" (2003, p. 137) Teaching can gain from reduction and is but moments accompanying complexity that define teaching and learning, as Graff argues. Beauty is certainly not the only metonym enabling such a reflective process prepares for integrative learning. I am proposing that integrative learning can be better communicated to students when it is described as a quality rather than only a skill that potentially arises from their learning. The implication here is that as beauty involves a spectrum of sensory experiences that may be structured in hierarchies of value varying from person to person, to take this inquiry further, it is essential that an inventory be made of how the experience of beauty (questions and doubts about it included) presents to students.

As for teachers, beauty as a metonym for integrative learning allows us to bring the intellectual, moral and aesthetic into encounter; beauty can hold up all of them. David T. Hansen argues when teachers practice a "*poetics of teaching*" that "*highlights intellectual aspects of the work that accompany the aesthetic and the moral,*" (2004, p. 135) it is more likely that a "*holistic outlook*" is conveyed to students. As the teacher "*urges students to extend and deepen their insights, understandings, questions, abilities, sensitivities, and knowledge. In this manner, a poetics of experience merges with a poetics of practice.*" (2004, p. 135) I aspire to the way Hansen sees teaching as a place for beauty, "*not in a sentimental, cloying, or Pollyannaish sense of the word, but in the sense of discerning, fueling, and remembering the emergence in a student of a new insight, a new disposition, a new understanding—of something that, in a more figurative sense, shines.*" (2004, p. 133) For what it can shine upon beyond our expectation, beauty may become daunting, even intimidating: it shows the errors we make about it (Scarry, 1999, p. 14-15). This is also why Scarry argues paying due attention to beauty and stating it well is a matter of justice, salient to education. In *On Beauty and Being Just*, Scarry says the willingness to "*revise one's own location in order to place oneself in the path of beauty is the basic impulse underlying education.*" (1999, p. 7) When we submit ourselves to other minds, there is a higher chance, that

“one will be looking in the right direction when a comet makes its sweep through a certain patch of sky.” (1999, p. 7) Scarry goes as far as to argue that university is a “*precious good, with a primary task of begetting beauty,*” even when it finds itself interrupted by “*institutional gravity and awkwardness.*” (1999, p. 8)

The more beauty is shown to be fragile, the more it invites those potentially exposed to it to share the duty to recognize and reproduce it. The contentions and challenges that beauty poses compels deliberation rather than simple acceptance. As a quality, beauty captures what integrative learning requires: to activate the capacities of imagination, to confront intellectual uncertainties and ambiguities of understanding, and to be challenged to be honest with one’s moral dilemmas. Beauty as metonym of integrative learning is not only conducive to student learning experience, but also to our teaching experience. While beauty as metonym does not exhaust what integrative learning is, by way of evoking qualities associated with the ends of undergraduate learning as a whole, it inspires way more than policy language can.

I have been experimenting with beauty as a metonym for integrative learning. As I write, I am rounding up the fifteenth year of my being a teacher in the General Education Foundation Programme at the Chinese University of Hong Kong. The programme is part of the core curriculum. It is compulsory for undergraduates and a prerequisite for other General Education courses. The Programme is consisted in two courses: In Dialogue with Humanity and In Dialogue with Nature. My main duty is to teach the former although I have also taught the latter, which has given me insight by the challenges of integration the Programme poses.

When I first joined the teaching team of the Programme, I was overwhelmed. As much as I tried to assure myself that having been half-trained in anthropology, cultural studies, critical theory, theories of feminism, phenomenology, I could only see myself as an amateur, and perhaps even a beginner, in face of each classic. I say *half-trained* because my research interests prior to and culminating into my PhD thesis was a mixture of multiple fields of knowledge. As a teacher, I aspire to teach better without pretending I can be an expert of teaching in practice. I let my curiosity direct where I went, to make meaning of the scholarship I encountered, and was happy to have survived, and even better, teaching now in this Programme that was unique in the Hong Kong higher education system: no other university presents such a core text programme of General Education.

It was not only the lack of expertise in what I have to teach, but the very notion of expertise deliberately and productively challenged by the idea of General Education itself in a profoundly intellectual way, that caused the aporia. It marks where my post-PhD training begins. Any expert position is partial in relation to other expertise, and that it is when this partiality is acknowledged, its authority suspended in face of the equal partiality of others, that learning on the teachers’ part

must begin. Only then can students find their own way to make sense of their academic and other activities in life. We have to learn to learn.

While I cannot pin down the causes of the integrative quality of students' reflection, I see several elements I can strengthen in my teaching. First, to make it a routine in the process of the course that they become aware of their goals in university life, even when at times they are confusing. Second, to emphasize wholeness of a person in one's life as a "*narrative quest*" (MacIntyre, 1984, p. 219) of which studying is only a part. Third, to take all that they are curious about as relevant to learning and make space and time for them to dwell in their interests. Fourth, to demonstrate to them there is a lot more beyond our reading list, and the list is not a trophy to have, marking competence and learnedness as against those who have not covered the list; rather, it is a doorway opening to infinite horizons. It is up to students to make choices that matter to their evolving lives.

I have been inspired by the syllabus I teach to argue for beauty as metonym for integrative thinking. Beauty arises as competing accounts in the classics from various cultural traditions that I teach. Each classic becomes in itself a multi-faceted artifact from the past. They are however not only of the past; without being bound to disciplines, each one becomes dynamic and generous, open on many sides for readers to engage with. For indicative rather than exhaustive purposes here, I exposit several of them.

Karl Marx's "Estranged Labour" in the *Economic and Philosophic Manuscripts of 1844* is the first text I use to open the course. Marx begins with a critique of capitalist mode of production, but expands into how the human senses, their spontaneity and spiritually directed essence, are capable of following "laws of beauty" (Marx, 1988, p. 76) even when he has not in this text elaborated on what he means. Another text in our syllabus is the ancient Chinese philosopher Confucius. In the *Analects*, a compilation of his teachings by his disciples, Confucius speaks of the ideal character of junzi committed to bringing beauty out of others, or striving to be part of others' accomplishment as beauty. We also have the *Symposium* in the syllabus, in which Plato is skeptical of beauty in the sensible world. Jean-Jacques Rousseau does not explicitly concern himself with beauty, but when he uses the metaphor of a dying old oak for arbitrary rule, one discerns the alternative: legitimate rule as the source of dignity for human beings who reason their way to justice. Master Thich Nhat Hanh's commentary on the Buddha's teaching in the ancient Heart Sutra demonstrates how even when there is beauty, like all other entities and phenomena, it is empty – emptied of a separate self and impermanent. All the above are subject to debates and deliberation in class, and beauty is only one among many others that can prompt perennial questions we have asked about ourselves. My point for the purpose of this paper is that abducting the notion of beauty from the texts could help students release their imagination and suspend the hold of each on them as expositions of argumentation only—and not all texts can be best

categorized as such—so they find ways to think otherwise. Another way to put this is, there is a hinterland they can visit; when there is a chance to leave, there is a promise of return.

Some of us might be anxious because of the lack of consensus about what beauty is, hence how it could be effectively employed as a metonym of integrative learning. I do not think we need a knockdown, single, or foundational definition of it. Beauty as metonym of integrative learning tells us what it looks like as a quality of the mind when written. Three of my former students show how.

In “A Poetic Encounter”, Huzeyfe Kiran, my student in both the In Dialogue with Humanity and In Dialogue with Nature courses, engages with the phrase “*poetic encounter*” from a video I showed in the first class. At the time, he found it “*shocking due to its mystifying perplexity*” (Kiran, 2020) It was after years, as he wrote the reflection, that he was able to make connections between the course, his life, and the world. The poetic, for him, is a hinge for intellectual, emotional, social aspects of his life. A Computer Engineering student at the time, and now, an Anthropology graduate student, he also engaged the multi-faceted encounters in the course with a Turkish poet he had known from his culture, Yunus Emre. He makes learning purposeful for himself, and global, as in presenting an expansive reach and horizons. He integrates understanding of who he was, who he has been evolving into and who he wants to be. His account also shows that integrative learning takes time; it can happen if puzzles are preserved rather dismissed or directed to become answerable questions too hastily.

Myrmidon Kangara was my student in In Dialogue with Humanity. Her essay begins with acknowledging the intellectual complexities of the course materials, seeing each partially and each as a partiality. In the reflection, she admits realizing how having taken a distance from the course in the time of her writing, she can return to the question of what makes a good person and a good life and a good society. She forges dialogues with Lord Atkin, Ayn Rand, and ancient Greek and Roman ideas that are way beyond the course. It is her realization of the responsibility she owes to the course’s prompting questions, that she concludes, “*the world is both in my hands, and out of it.*” (Kangara, 2020) Her purpose of learning to learn is clearly stated in poignancy in a prospective lens, embracing and being honest with what she knows and what she remains uncertain about as a whole.

Wong Yuen-lung, also my student in both the In Dialogue with Humanity and In Dialogue with Nature courses, brings the reflection in the Programme to other courses in his university life. He looks back to his confusion about what matters in his “*U-life.*” (Wong, 2021) He is aware of his confusions and doubts, while being open to where they might take him – according to our plan, and according to his purpose of learning: to be motivated to keep learning. The result? “*I felt good as I have assimilated my estranged life into an exhilarating hunt for meaning.*” His account

demonstrates his aspiration to grow intellectually and morally in serene composure despite occasional disturbances.

To reiterate, I am not arguing beauty as a metonym for integrative learning can substitute for the exposition of what integrative learning is. I am proposing that coining beauty can better communicate this essential quality of undergraduate experience as dynamic and open-ended, highlighting the potential excitement and joy of learning.

This is important not only to students, but also myself as a teacher. Beauty as a metonym for integrative learning is an invitation for me to integrate my art practice off campus with what I commit myself to on campus. To bring what I do off-campus in the contemporary arts to the classroom, I reflect on my work with artists, following how they think, to find ways to approach the syllabus at a distance from established disciplinary boundaries, away from how each is fixated into the intellectual labour division of the modern research university. This enables me to let each classic breathe in a way not predominated by the ways conventional academic disciplines categorize them.

Here are several examples that illustrate my case in point. In my opening tutorial to introduce the course, I show students Rose-Lynn Fisher's "Tears Topography", to make the point that a course on humanity needs to address the history of inhumanity. Where there is affliction, there is also transformation. I show Bill Viola's interview about his experience of drowning, his commitment to self-dialogue, and to a world that is beyond the surface, that is real. In the interview is an excerpt of his video work "Raft". The camera is fixed on a dozen persons standing, each focused on their own activity, while suddenly, a gush of water as if coming from a hose push them in uneven speed onto the ground. It gives a sense of awe through human vulnerability – in the moment, we are equalized.

As inhumanity becomes specific in Karl Marx's "Estranged Labour" as a form of slavery that the capitalist mode of production perpetuates, I show Alfredo Jarr's photographic installation of Brazilian miners juxtaposed against the stock prices of gold. It becomes a prompt to open up the question about price and value as being equivalent or not. Allan Sekula's photograph of a factory girl is also used to prompt the question of whether the Marxist critique takes away the agency of workers. Students are led to confront the ambiguity of meaning in artworks, and open to multiple interpretations. I show sculptures of the 19th century Belgian artist Constantin Meunier and prompt such questions as how the contrapposto position with a long history in Western art allows the artist to confer integrity and dignity upon the worker. When it comes to the Buddha's teaching in the Heart Sutra, I invite students to share what they sense in Picasso's Guernica, so we find a language to talk about suffering and not let ourselves turn away from it.

I am not arguing that beauty is my pedagogical goal. I am instead making a case for beauty as a hinge that allows for the intellectual, moral, and aesthetic integration in Hansen's sense. Beauty as metonym offers the chance of crystalizing and registering the multiple modes of existence of human and non-human lives that are the priority attention of my teaching in a humanities classroom for today. By way of closing, I will make connections with colleagues' narratives a response to course and disciplinary isolation, to take beauty as a metonym to another level, relevant to the problem I mentioned above regarding the isolation of ourselves as academics. The reflections affirm my conviction in the importance of taking risks in the classroom by living with and formulating questions, or, what beauty as metonym allows for being connected with what is yet to be known.

In troubling the dichotomy of competence and proficiency in public schools in the US, Mike Rose demonstrates the limits of the language of competence and deficiency that schools deploy to categorize students. Coupled with the language and imperative of efficiency, such a dichotomy turns the ends of education into one that serves "*designation of otherness, difference, and deficiency.*" He cautions, "*the ease with which we misperceive failed performance and the degree to which this misperception both reflects and reinforces the social order.*" (2006, p. 205) I regard his reflection as inviting teachers to, in the first place, think of what makes sense and what matters to students' learning experience first. While Rose's vision is limiting for my teaching in that I work from a place where freedom is an "*apparition*" (Arendt, 1961, p. 4) and democracy, taboo, I am motivated to look for a different grammar of connection: beauty that systems of power cannot monopolize, or do not understand. This is the groundwork. Two other narratives are from Jane Tompkins and Richard E. Miller. They both employ metaphors to describe their commitments and aspirations that I find beauty working as metonym for integrative learning on the teachers' part.

Jane Tompkins criticizes her own fear of not getting a good opinion from students. Her reflection leads her to a kinder and more sensitive view towards one's own needs, so that we bring the same from students, as workers in the academy and as people in the wider world. She sees each of her students as "*a walking field of energy teeming with agendas.*" (1990, p. 659) While the method Tompkins uses to work with whoever signs up on topics of their choice is not an available choice for me, her reflection inspires me to avoid the false binary of juxtaposing the teacher as insider of knowledge and students as outsider. To regard the two as an integrative whole is to regard teaching as community work.

Richard E. Miller focuses specifically on writing. He argues, "*[F]luency alone does not ensure that any of these rhetorical approaches will include the dialogic aspect, which must be present if the process of composing is ever to serve the function of generating hope.*" (2005, p. 47) The work of learning "*how to make oneself heard*" has to be coupled with "*learning how to speak and write so others could hear us.*" (2005, p. 47) While "*apocalyptic visions*" (2005, p. ix) in education and specifically the humanities are real, teachers are still commit to a kind of writing

that “asks the reader to make imaginative connections between disparate elements; it tracks one path among many possible ones across the glistening water. This writing is the lifeblood of the humanities in action.” (2005, p. 196-198) All three narratives demonstrate that integrative learning is sparked off and sustained by having beauty as its metonym.

Many times, I am not sure if I am witnessing beauty or its loss in the classroom. Despite, I am motivated to try a little more by letting go of my teaching plan, playing along more with students, embracing accidents, failures, puzzles... Beauty as metonym for integrative learning allows for broadening my imagination as to how I accompany my students on their learning journey by moving with them, even with uncertainties.

Students are nomads. In any typical day, they come into my classroom having passed through numerous other classrooms, lecture halls, laboratories, canteens, a bench in the plaza, among other locales. In a touch and go mode, they thrive. To accompany them well, I have to move in ways that respond not only to the syllabus, but also resisting the ways they may be stalled. (Stryker, 2021) We can show them what prepares them for integration: what activity it is, what it entails – the adventures and risks, and the potential rewards as much as failures.

When beauty disturbs learning, policy wills control as counter balance. But if learning always already involves the experience of one’s ground being swept away and efforts to find equipoise again, beauty might be more a friend than foe. One might even say, reality is already disturbed by the commitment of teachers who strive to show students beyond what institutional pressures direct. To make integrative learning happen through conjuring beauty in its complexities and ambiguities is to love teaching enough to trust that even a tiny spark or a whispering twinkle popping up in a student’s life matters.

It is not the first time, and it will certainly not be the last time, that education is compelled to respond to dark times. Beauty as metonym is more likely to keep hope alive, even when distress and despair are real.

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