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Conceptualizing Lifelong Learning for K-12 Education

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Keywords

Lifelong learning, learners, assessment, K-12 education, schools

Cover Page Footnote

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Conceptualizing Lifelong Learning for K-12 Education

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Abstract

In this era of rapid evolution, education in the twenty-first century must strive to develop students into lifelong learners. Students should possess goals and life-ready competencies for continuous learning during formal, non-formal, and informal education. Within a globalizing world, lifelong learning skills enable students to manage difficulties and challenges. Lifelong learning for K-12 education may shape our students' values and behavior and build resilience in facing challenges ahead. To date, educational research related to lifelong learning across varied contexts of K-12 education is still in its infancy. The present paper contributes to the conceptualization of lifelong learning for K-12 education and provides a deeper understanding of future directions for research in this area. It explains various perspectives of lifelong learning and its operationalized definition for the K-12 educational contexts. Subsequently, it proposes a whole school approach to cultivate continuous learning in students and an assessment for lifelong learning. Finally, implications and recommendations for the K-12 education of lifelong learning are also included.

Keywords: Lifelong learning, learners, assessment, K-12 education, schools

Introduction

In the Western tradition, there is a proverb, "It is never too late to learn.". Likewise, the Eastern Confucian culture thought of learning through one's life as a process to "become fully human" (Sun, 2012). Lifelong learning is the volitional act of learning throughout one's lifespan (Jones & Mclean, 2018). It has become increasingly apparent in K-12 education that students should remain economically and socially engaged throughout one's lifetime. Schools can make a difference in nurturing students' skills by laying the foundations (e.g., a supportive climate) to maximize the chances of continuing their engagement in lifelong learning practices (Taranto & Buchanan, 2020; Wehmeyer et al., 2017). From an educational psychology perspective, lifelong learning refers to the motivation for learning and the competence to apply one's skills and knowledge successfully in learning situations (Ng, 2019). From a social and education policy

perspective, lifelong learning is considered the "necessity of being able to handle constant change and transition as a result of rapid technological and scientific changes" (Lüftenegger et al., 2016, p. 720).

Lifelong learning is not just an extension of the process initiated at school. However, it is also a unifying concept that combines learning with all life domains, including work, family, citizenship, and personal development (Atchoarena & Howells, 2021). Over the past decade, lifelong learning has been considered a global investment in creating opportunities for all, such that individuals can learn across the whole life span. In recent years, technology-mediated learning environments have provided access to self-directed learning and a system that encourages individuals and communities to become autonomous learners (Miller & Wu, 2018; Ng et al., 2020). These enabling conditions promote flexible transitions between education and work, support professional development, and foster physical and mental well-being, which are essential to everyday life (Atchoarena & Howells, 2021). Today, lifelong learning is most often cited and has become a globalized 'buzzword' because of career shifts when jobs are rendered obsolete due to technological shifts. In this retrospect, individuals of all ages should continue to learn and build skills and knowledge in life.

Although there are international initiatives and models of lifelong learning, there needs to be a clear operationalization of lifelong learning for K-12 education. It is not easy to operationalize lifelong learning for K-12 education because this concept originated from adult education with the notion that adult learners have the agency to learn through life and maintain employability (Ng, 2022a, 2022b). Linking to K-12 education, lifelong learning should encompass individual and social development in all settings. Even though lifelong learning is essential, and definitions abound, more attempt has yet to be made to operationalize lifelong learning for K-12 education. Since it is viewed as an ongoing, intentional pursuit of knowledge for personal or professional reasons, it is thus necessary to provide adequate environments where learners can develop lifelong learning skills (Ng, 2019). Lifelong learning skills refer to individual capacity for self-directed learning supported by metacognition and self-management (Dunlap & Lowenthal, 2013). Students with lifelong learning skills are likely to have an enduring motivation and appreciation for learning. It is thereby essential to conceptualize lifelong learning in the context of K-12 education. First, lifelong learning has been defined by

national and transnational organizations, usually in the form of agenda-setting for multi-sector participation. Second, these definitions of lifelong learning are expansive. However, they need to give more attention to K-12 education. Third, more work is needed to understand how K-12 education helps or hinders students' lifelong learning.

Because of the reasons mentioned above, this paper attempts to conceptualize and translate lifelong learning for K-12 education. As much as there is definite value in learning for life, the contribution of this paper is to operationalize lifelong learning for K-12 education and provide a deeper understanding of future directions for research in this area. This paper begins by outlining the background of lifelong learning, discussing the importance of cultivating skills and values earlier in life, followed by its conceptualization for K-12 education. Subsequently, it discusses transforming schools for lifelong learning, including the proposed whole-school approach and assessment. Finally, it ends with practical implications and recommendations for promoting lifelong learning in schools.

Lifelong Learning

Lifelong learning is a concept for re-organizing education and extending it beyond formal education (Schuetze, 2006). Specifically, formal education consists of the perceived formative age of people and the system of schools and tertiary institutions. However, lifelong learning seems nebulous as a concept used diversely across all educational levels, from classroom-based curriculum through adult education to policy for the past three decades (Pendergast et al., 2005).

The idea of lifelong learning was developed initially in the early 1970s as an international agenda by the United Nations Educational, Scientific and Cultural Organization (UNESCO). UNESCO advocated lifelong learning as the need for individuals to learn through life for social, cultural, economic, and personal fulfillment (Schuetze, 2006). Until the 1990s, the concept of lifelong learning has been applied mainly in vocational education (i.e., formal post-compulsory and continuing education) and adult education (Pendergast et al., 2005). However, it is crucial to focus the shift of this concept on its potential applications within K-12 education. In 1996, the Organization for Economic Cooperation and Development (OECD) supported the implementation of lifelong learning for all individuals and ages, emphasizing continuity and learning transition to meet the challenges of a globalized economy (OECD, 1996). Subsequently, the European Commission (EC) proposed an overarching strategy which is a series of Lifelong

Learning Programs (LLP) for educating and training individuals across Europe of all ages to learn and grow (EC, 2002). The following paragraph defines the three key perspectives of lifelong learning: first is from UNESCO, second is from the International Labor Organization (ILO), and last is from the European Commission (EC). Lifelong learning refers to the following:

- *All learning activities are undertaken throughout life to improve knowledge, skills, and qualifications for personal, social, and professional reasons (UNESCO, 1984);*
- *All learning activities are undertaken throughout life for the development of competencies and qualifications (ILO, 2006); and*
- *All general education, vocational education and training, non-formal education, and informal learning are undertaken throughout life, resulting in improved knowledge, skills, and competencies within a personal, civic, social, and employment-related perspective. In addition, it includes counseling and guidance services (EC, 2006).*

In recent years, UNESCO has been promoting lifelong learning opportunities for all. The concept constitutes a benchmark for designing and reforming education systems and policies and builds a bridge between education and employment (UNESCO, 2016). The overall intent for lifelong learning is about how learners, educators, educational institutions, workplaces, and communities could engage one another to support learning (Billett, 2018).

Lifelong learning is multi-faceted, shaped by decades of international policy debates and agendas (Atchoarena & Howells, 2021). It refers to "the way one's learning pathway is built through life, articulating the learning process to different life contexts. The interaction between education and its application in real-life situations gives a sense of purpose to lifelong learning" (p. 168). The following section describes the importance of creating a lifelong learning environment for K-12 education.

Lifelong Learning for K-12 Education

Longworth (2003) defined a more straightforward perspective of lifelong learning: continuous and self-directed learning that takes place through life; is intentional and the act of one's volition (i.e., the desire to learn); and happens in formal, informal, and non-formal education. Formal learning takes place within an organized and structured context (e.g., in schools), informal learning results from daily life activities or experiential learning (i.e., beyond schools), and non-formal learning refers to vocational skills acquired at a workplace (Tissot,

2004). Subsequently, Bryce (2004) conceptualized lifelong learning in the context of secondary schools:

- Understanding the need and ownership to learn;
- Learning is about how to think rather than what to think;
- Teachers are mentors and models of lifelong learning in contrast to being dispensers of knowledge;
- The purpose of assessment is to assist and encourage further exploration rather than to categorize or merely relate students to a 'norm'; and
- Learning should be an enjoyable and integral part of one's life.

Lifelong learning herein is conceptualized as an individual and a collective learning journey.

To simplify the concept of lifelong learning for K-12 education, the two key dimensions are individual and system (see Table 1). It is continuous learning with autonomy (i.e., individual) and a collective learning process through one's lifespan, highlighting the diversity of learning environments and socially constructed experiences, usually categorized as formal, non-formal, and informal (i.e., system). This paper defines lifelong learning for K-12 education as individual and system characteristics. Table 1 summarizes a proposed lifelong learning framework with the two dimensions and their characteristics.

Table 1. Proposed framework of lifelong learning with key dimensions and characteristics

| Lifelong Learning | |
|--|--|
| Individual | System |
| Learning that takes place throughout one's lifespan (e.g., progression, personal growth) | Learning that takes place in formal, non-formal, and informal settings |
| Learning that is continuous and self-directed | Learning that involves technology mediation |
| Learning that is intrinsically motivated and self-directed | Learning that improves the quality of life in society |
| Learning that is to have ownership of the need to learn | Learning that is socially constructed |
| Learning that is influenced by individual characteristics (e.g., disposition, discernment, attitudes, aptitudes, competencies) | Learning that is influenced by social relationships (e.g., teachers as mentors in lifelong learning) |

Lifelong learning occurs in a socially constructed system and is influenced by social relationships. It is crucial for the development of an individual in terms of skills and knowledge (Lüftenegger et al., 2016). It varies across contexts and individuals, highlighting that individual development in a collective community and societal process plays a key role in lifelong learning (Demirel, 2009). As individual characteristics influence learning (e.g., disposition, discernment, attitude), students are likely to be more selective in learning and subject interest. In this manner, students experience a sense of autonomy and the joy of mastery inherent to lifelong learning (Ng, 2016). Dispositions toward lifelong learning include curiosity, willingness to learn, and making responsible decisions related to learning, while discernment refers to the ability to judge and recognize small details (Dunlap & Lowenthal, 2013). Individual characteristics of lifelong learning also include the centrality of the learner and motivation to learn.

The system herein relates to the idea of wholeness and a contextual framework for seeing the entire picture to understand an ongoing learning experience as an integrated entity by determining the interrelationships of elements involved (e.g., technology-mediated, socially constructed). The characteristics of lifelong learning comprise a system that includes formal, informal, and non-formal settings; sociocultural context; as well as the mediation of tools (e.g., language, technology). Relating the shift of K-12 learning from formal to informal and non-formal settings, the priority towards self-directedness and motivation is a key characteristic of lifelong learners. The design of the educational system could affect the school experiences of students. For instance, an educational system may involve technology mediation, or it can just be a physical environment such as a classroom. In a classroom, learning is likely influenced by social relationships such as peer interactions and teacher-student rapport. At the system level, the role of schools in developing lifelong learning capacities in students should thus be made explicit. As such, there should be an emphasis on connecting students and teachers and how students perceive their teachers as mentors. Relationship is the key to making the connection between school and real-life experiences.

In addition, lifelong learning involves mediational means such as personal norms and social forms. The way individuals mediate the norms during their learning experience (i.e., the process of construction and construal) is premised upon what they know and act (Billett, 2018). This mediation relates to individuals making sense of and responding to what they experienced

during the learning process. Individuals are empowered to learn, as technology can aid individuals in learning and participate more in the generation and diffusion of information, thus supporting individuals in deliberate learning (Su, 2007). Lifelong learning is associated with personalized (individual) learning and collective (social) well-being (Demirel, 2009). It is also related to autonomy and the desire to learn, with the purpose of learning and relationship development. As such, the involvement of a social context (i.e., system) should be addressed.

Lifelong learning for K-12 education is essential because it prepares students for lifelong learning and inculcates the value of starting young in schools. Moreover, school curricula should be adjusted according to different levels, facilitating the development of lifelong learning skills effectively. Lifelong learning contributes to personal and social well-being and the economic objective of educational policies. Based on the two key dimensions of the proposed framework, it hopes to contribute to individuals' potential to learn continuously, to educate for the future, and to promote learning for life. The subsequent section discusses transforming schools for lifelong learning through a whole-school approach and the importance of assessment.

Transforming Schools for Lifelong Learning

Reviews of education and research have consistently highlighted the importance of developing lifelong learning competencies and nurturing the ability to learn through life (e.g., Crick & Joldersma, 2007; Taranto & Buchanan, 2020). Evidence also suggests that schools should provide educational benefits and connections between learners and communities for meaningful education and lifelong learning (Wals & Benavot, 2017). However, the challenge for schools is to create an integrated social connection to embark on a whole school approach and develop learners' agency. Four areas of recommendation to transform schools for lifelong learning are described subsequently.

First, the whole school approach implies reconsidering and redesigning schools' operations, management, pedagogy, and learning (Hargreaves, 2008). Pedagogy and learning include teaching, learning, and participation in decision-making. Schools should tailor the content and pedagogy to students' interests to create opportunities for learning and the ability to learn through life. However, this is challenging because students' interests could be narrow or constantly shifting.

Second, a recommended approach is the analogy for "teach to fish," which is used to develop professional autonomy, practices, and values in students with the capacity for lifelong learning. In this manner, students are empowered to take responsibility for learning and integrating knowledge for future professional pathways or careers.

Third, there is a tendency to equate lifelong learning with non-formal and informal education because formal education involves academic subjects that could be daunting and stressful (Blaschke, 2021). Learning in informal and non-formal settings is equally important as learning in formal settings such as schools. Both informal and formal learning are taken together as the sum of an individual learner's experience and practice. Schools should embed in communities and non-formal and informal settings to ensure quality outcomes of lifelong learning.

Finally, schools are encouraged to lay cornerstones for preparing students for lifelong learning, such as offering opportunities for curiosity to learn and orient learners in a specific direction to learn lifelong (Ng, 2019). Learners should develop the enduring core of competencies, values, and character from a young age to have the resilience to succeed and build a strong foundation for lifelong learning. In addition, schools should develop a philosophy and curriculum to foster students' metacognitive skills that are foundational to lifelong learning. Students can then sustain themselves through challenges and disrupted lives, especially in today's evolving environments. Students with lifelong learning skills can take the agency to learn, make decisions, and continue learning beyond school and through life, which are related to sustainable education for their development (Taranto & Buchanan, 2020). Sustainable education refers to the provision of requirements to enable students to take learning into their own hands and become autonomous learners. Sustainable education is also about educating for the future, as education is one of the greatest assets heralded as a key strategy for developing individual skills, knowledge, and values (Bosevska & Kriewaldt, 2020).

A Whole School Approach for Lifelong Learning

A growing body of research suggests that the whole-school approach can effectively teach malleable skills (Goldberg et al., 2019). Lifelong learning skills are considered malleable because they are multi-dimensional and responsive to contextual change (Pedler et al., 2020). A whole-school approach is a concerted effort among school personnel, parents, and community

partnership to integrate skill development into daily interactions and practices (Goldberg et al., 2019; WHO, 1998). In addition, effective LLP or curriculum should provide continuous and consistent opportunities to practice lifelong learning skills during everyday classroom situations.

Based on a whole-school approach, LLP will be effective when schools engage teachers, parents, and the community. A school system with positive culture includes strengthening teachers' beliefs and creating an environment for continuous learning and learning for life (Lee et al., 2019). Adopting the whole school approach involves the school culture, organization, and community engagement. Across the contexts, the self, others, and the social group (school) may evaluate this effectiveness in social interactions. This paper defines a whole school approach as the social interactions among school leaders, teachers, parents, and supported stakeholders to support lifelong learners. Figure 1 presents the inter-relationships among the leaders-teachers-parents partnership and supported stakeholders within a school community, promoting a whole school approach to nurture our students into lifelong learners.

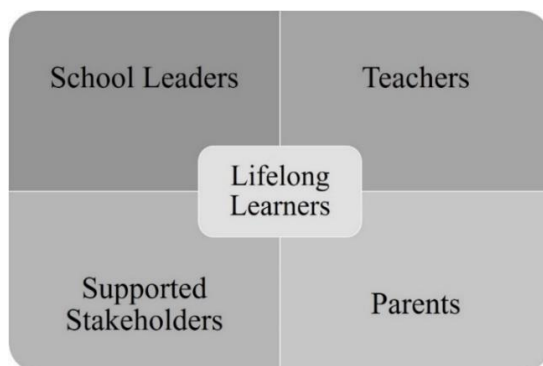


Figure 1. Proposed whole school approach for lifelong learning

A whole school approach herein aims to integrate lifelong learning skills into daily practices using collaborative efforts that include school leaders, teachers, supported stakeholders, parents, and students. Besides involving school personnel and teachers, parents and community stakeholders are part of the whole school approach because learning is not limited to only school settings. Learning also occurs in the home setting and non-formal environment. Parents and supported stakeholders should be engaged within a school community, as such relationships contribute to building ways of working together and understanding the values that drive a whole school approach to lifelong learning.

A whole school approach is to nurture our students to be lifelong learners and ensure that members of a school community sustain lifelong learning. Taking a whole school approach is to achieve positive outcomes such as confident and self-directed learners. However, the nature of a school is a critical factor for success in implementing the proposed whole-school approach and nurturing lifelong learners. There may be a prior structure or problems in school that hinder the challenges in implementing the whole school approach. However, when the entire school's culture desires lifelong learning, the school leaders, teachers, and personnel will likely adopt such an approach to benefit students and staff. Besides the school elements to advance this approach, building a societal relationship with the parents and communities is crucial. Although the school culture may influence the success of implementing the whole school approach, the critical focus is a student's learning and experience. By taking students' perspectives and understanding the need for developing lifelong learners, this whole school approach can promote lifelong learning for K-12 education. The following paragraph describes an example of how this approach may be used to nurture students to be lifelong learners.

A whole school approach is a guiding principle to start lifelong learning and nurture the capacity to use personal knowledge to perform effectively and solve problems in a particular domain. The school must envision the importance of lifelong learning such that there is top-down accountability and support from the school leaders. By promoting lifelong learning skills to our students, we as educators show them a new way to solve a problem by applying their knowledge effectively that they might need help initially. We should also develop our students holistically – to be citizens and members of a local and global community.

Teachers must teach students how to fish so that they will have 'food' for life (Hewitt, 2012). Teachers can provide a learning environment that is desirable and important in life by acknowledging the role they put themselves in each time when they teach their students. By creating opportunities for our students to apply lifelong learning skills and creating personal value in doing a school task, this approach helps to internalize students' knowledge and accomplish learning goals. When teachers perceive themselves as lifelong learners, they are more likely to influence students to be lifelong learners. For teachers willing to explore and learn new ways to incorporate such learning activities to create personal value for students, the breadth and depth of learning are likely enhanced through the richness of experiences and purpose. Thus,

teachers are considered effective role models of lifelong learning (Hewitt, 2012). With this role model as an example, students will likely be motivated to become lifelong learners.

Besides teachers, parents should also be role models of lifelong learning. Lifelong learning is about educating for the future and learning for life. Therefore, getting parents to 'buy-in' and be effective role models of lifelong learning is necessary. Moreover, school leaders and teachers should interact more with the parents and communities (i.e., supported stakeholders). Collaborations with supported stakeholders could also strengthen this school's vision and actively incorporate the elements of lifelong learning into the school curriculum. Teachers and school personnel could collaborate with parents and a wider community (i.e., supported stakeholders) to create a curriculum of wholeness and conditions for learning experiences.

This is the first paper to propose a whole-school approach to lifelong learning. The rationale of this approach is to nurture and sustain lifelong learning for K-12 education. In addition, the whole school approach for lifelong learning will (1) integrate the school culture and daily school practices, (2) engage teachers, school leaders, and personnel, (3) reinforce lifelong learning skills outside the classroom, (4) support parental and community engagement such as supported stakeholders. Altogether, these characteristics highlight the potential of adopting a whole-school approach to enhance students' well-being and engagement in lifelong learning practices.

Maximizing lifelong learning requires a whole school's consistent effort, with students connecting to teachers as mentors. Through joint effort and collaboration, school leaders and teachers can also efficiently support and encourage students' academic success at the whole school level (Jasna, 2021). Although the school system plays a core role in motivating students to remain in school to learn and participate in learning beyond school, there are factors that we should consider when promoting lifelong learning. Factors such as individual psychological aspects, parental attitudes, and sociocultural values should be considered, yet not limited to students' learning experiences and being lifelong learners.

In summary, a whole-school approach to lifelong learning defines the entire school community as the unit of change and involves coordinated action from parents and support stakeholders. Embedding parents within a whole school approach may complement the roles of educators and extend opportunities for learning across these two contexts since children spend

the most time at home. Collaborations with supported stakeholders will also create opportunities for students' hands-on experiences and nurture lifelong learning skills. Schools could also provide character-building activities or extra-curricular programs to facilitate students' skill development, develop academic, social, and behavioral skills, and equip learners with 'know-how' and what to think (Mason, 2013; Taranto & Buchanan, 2020). The whole school approach, a coordinated effort, will likely nurture lifelong learning for K-12 education.

Assessment for Lifelong Learning

In addition to the proposed whole school model, it is important to consider assessment for lifelong learning. The assessment for lifelong learning is an issue of global interest, paralleled by the shift in the learner's ability to reconstruct knowledge and engage with change (Su, 2015). As such, assessment plays a role in helping learners to learn on a continuous, sustainable basis. An example is a formative assessment that supports lifelong learning competencies (Clark, 2012). However, lifelong learning may involve more than just formative assessment. There is also an individual aspect of lifelong learning that requires self-assessment and a standard reference of how much one has learned (Su, 2015). This section highlights the key role of assessment for lifelong learning in measuring learning quality and outcomes.

Formative assessment takes a holistic approach to evaluate students' learning process and to provide evidence of learning through interactions on an individual and collective basis (Macintyre et al., 2007). Therefore, formative assessment has the potential to evaluate lifelong learning and restore dynamic interactions during participation (Clark, 2012). In addition, formative assessment links the process of learning by connecting the content and the learner's reasoning to the product of learning (Macintyre et al., 2007).

To ensure the effectiveness of lifelong learning, self-assessment is an approach to evaluate individual learning and progress. Self-assessment for lifelong learning is a process or product of one's learning to gauge individual perceived progress or outcome (Panadero et al., 2019). This process involves decision-making about individual performance to the standard or quality of performance. Self-assessment is a formative assessment process in which individuals reflect on and evaluate the quality of their learning and work. It is also a process to assist learners in identifying strengths and weaknesses in their work (Alt & Raichel, 2020). Self-assessment provides the foundation for the relevant skills that students need as lifelong learners after school

(Su, 2015). Self-assessment is therefore considered a critical skill for learners and is fundamental to lifelong learning (Malan & Stegmann, 2018). According to Malan and Stegmann (2018), there is a strong link between peer assessment and self-assessment. Peer assessment is considered an external evaluation of another student's work which could complement self-assessment of own work and learning. This approach may provide an understanding of students' strengths and weaknesses in their learning.

When encouraged to be lifelong learners, students should act independently, reflect on, and manage how they learn to establish meaningful connections with the world. Su (2015) stressed that self-assessment should be the central, fundamental aspect of assessment for lifelong learning, with informed feedback for the learner to improve learning. Using feedback in the form of assessment is a valuable approach to help learners self-regulate learning in a meaningful and sustainable way (Roche, 2015). Moreover, it should be noted that assessment evaluates the learning experience without interrupting the learner's process.

Practical Implications and Recommendations

A growing body of literature shows that the conceptualization of lifelong learning frameworks differs and is used to define or shape educational policy and practice (Webb et al., 2019). Conceptualizing and understanding lifelong learning for K-12 education is thus vital. Suppose there are opportunities to understand the implementation of lifelong learning. In that case, future research studies should explore how lifelong learning is understood in current policies and practices and how lifelong learning in schools can be captured and reported internationally. Lifelong learning for K-12 education is thus vital, and this paper emphasizes the need to explore such research. Schools have predominant social influences during an individual's life, which can be instrumental in one's developmental outcome (Deci et al., 1991). Teachers in the classrooms are instrumental in student learning and positive outcomes; as such, the primary determining elements in class may foster or thwart the process of lifelong learning (Ng et al., 2015). A teacher's interaction with students in the classroom can be presented in a motivating approach to nurturing student curiosity and learning for life (Ng & Latife, 2022). Taken altogether, it is an invaluable endeavor to discuss lifelong learning for K-12 education and how it could translate to student motivation to learn and learn for life.

Lifelong learning provides the foundation for better continuous learning and skill development. Learning environments should be effectively created to promote and develop students' lifelong learning skills. Considering this, teachers and school leaders may implement lifelong learning skills around classroom instruction and within the curriculum design. Practitioners and teachers should understand what lifelong learning is and how to identify a lifelong learner (Ng, 2019). Lifelong learners can perform tasks that may require complex judgments about their learning (i.e., self-assessment) and that of classmates through peer assessment (Malan & Stegmann, 2018). Furthermore, lifelong learning is increasingly important because it is highly valued in future careers and aligned with developing individuals' professions (Billett, 2018). Parents should also play the role of lifelong learners to nurture the importance of lifelong learning in children.

In short, the informal definition of lifelong learning is that we learn from the cradle to the grave and should learn for life. As educators, we should actively and socially engage our students, facilitating them to develop self-agency and self-regulation from youth. A lifelong learning context should be socially engaging and interactive, supporting "students' capacity for social, contextual, complex, multi-faceted, self-regulative and reflexive learning" (Roche, 2015, p. 4). This self-regulation relates to students setting goals and regulating the action to ensure staying on track to achieve goals. In contrast, reflexive learning involves self-reflection of students to self-evaluate performance upon completing a task (Taranto & Buchanan, 2020).

Due to the full curriculum in schools, there are constraints to conducting lifelong learning activities that include knowledge- and skills-oriented learning tasks in class (Lee et al., 2019). Knowledge-oriented skills relate to the learner's capacity to retrieve what they have learned and apply contents in another context, while skills-oriented learning sustains learners through challenges and uncertainties. For instance, teachers can provide opportunities for challenging tasks to students with increased competence, empower them to learn, and make their own decisions during the learning process (Ng et al., 2016). In addition, teachers can make a difference in students' learning by impacting their motives and needs through interpersonal interactions. As lifelong learning and academic performance are mutually dependent, efforts should be made to promote these skills simultaneously, reducing time pressure for teachers. One

recommendation is to implement lifelong learning skills in the teaching curriculum, as teachers may use formative assessments to evaluate students' learning process.

Sometimes, schools have resource limitations and may need to expand networks to the community, parents, and support stakeholders. In addition, parents' teams and stakeholders may form a practice of multi-disciplinary collaboration to support students' lifelong learning. Hence, the engagements of school staff, teachers, parents, and supported stakeholders through the whole school approach are effective strategies in implementing LLP. A school-based curriculum development program in lifelong learning is recommended, linking class teacher sessions, life experience, and collaboration with parents and the school community. Based on this recommendation, lifelong learning may be incorporated into the core teaching curriculum to support students' learning. An effective teaching approach should include lifelong learning-based activities, including formal, non-formal, and informal learning. Lifelong learning-based activities include effective goal-setting techniques across subject domains and broad theme-based learning with varied assessments (Hui et al., 2019). Such designed learning activities would develop and equip students with personal skills and abilities to set their own life goals, preparing them for the future.

Finally, a recommendation for K-12 education is to create a social environment for lifelong learning, such as a makerspace in schools. Makerspace, a 'space' for sharing knowledge and ideas, may play a role in nurturing lifelong learning in students in terms of how and where ranging from a formal environment (e.g., classroom, school) to both informal and non-formal settings. Makerspace may set the stage for lifelong learning, promote interpersonal interactions, and support the social experiences of our students. Makerspace allows students to explore knowledge, decide on the content, cultivate learning interests, and interact with peers (Dai & Yu, 2021).

Lifelong learning skills are essential for acquiring knowledge and goal fulfillment of individuals within the context of interpersonal and social relations (Crick & Joldersma, 2007). Students should cultivate lifelong learning habits so that learning is continuous and sustainable for personal and educational development. Nevertheless, the school and teachers may relate to successfully implementing lifelong learning. It may be beneficial to explore these factors, including the perspectives of school leaders and teachers on lifelong learning implementation,

thereby providing insights into developing a whole-school approach for sustainable education. There is a broad spectrum of learning with diverse learners who can learn in formal, informal, and non-formal settings. Creating learning spaces and communities is likely to enhance lifelong learning skills.

Conclusion

There is a growing need to promote lifelong learning for K-12 education to prepare future generations for the complex and evolving world. Taking this into account, a key focus is to reform education in schools to support students in developing lifelong learning skills to stay resilient. This paper has highlighted that an emphasis on nurturing lifelong learning for K-12 education is essential for success in today's information and knowledge acquisition era.

Lastly, we should rethink learning and teaching practices at schools in a lifelong learning context. Learning is not just the interplay between teacher and students; learning is also about being a designer and a creator of a lifelong learning culture at schools and beyond schools. Therefore, it is crucial to consider the process of continuous learning and to create conditions for it. Together, future research on lifelong learning for K-12 education to transform schools may come to fruition soon.

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References

- Alt, D., & Raichel, N. (2020). Problem-based learning, self-and peer assessment in higher education: Towards advancing lifelong learning skills. *Research Papers in Education*, 1-25.
- Atchoarena, D., & Howells, A. (2021). Advancing learning cities: Lifelong learning and the creation of a learning society. In *Powering a Learning Society During an Age of Disruption* (pp. 165–180). Springer, Singapore.
- Billett, S. (2018). Distinguishing lifelong learning from lifelong education. *Journal of Adult Learning, Knowledge and Innovation*, 2(1), 1–7.
- Blaschke, L. M. (2021). The dynamic mix of heutagogy and technology: Preparing learners for lifelong learning. *British Journal of Educational Technology*, 52(4), 1629-1645.
- Bosevska, J., & Kriewaldt, J. (2020). Fostering a whole-school approach to sustainability: Learning from one school's journey towards sustainable education. *International Research in Geographical and Environmental Education*, 29(1), 55-73.
- Bryce, J. (2004). Different ways that secondary schools orient to lifelong learning. *Educational Studies*, 30(1), 53–63.
- Clark, I. (2012). Formative assessment: A systematic and artistic process of instruction for supporting school and lifelong learning. *Canadian Journal of Education/Revue canadienne de l'éducation*, 35(2), 24-40.
- Crick, R. D., & Joldersma, C. W. (2007). Habermas, lifelong learning and citizenship education. *Studies in Philosophy and Education*, 26(2), 77-95.
- Dai, H., & Gu, Y. (2021). Analysis of design points of deep learning supported by maker space. *Journal of Physics: Conference Series* (Vol. 1738, No. 1, p. 012123). IOP Publishing. <https://iopscience.iop.org/article/10.1088/1742-6596/1738/1/012123/pdf>
- Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and education: The self-determination perspective. *Educational Psychologist*, 26(3-4), 325-346.
- Demirel, M. (2009). Lifelong learning and schools in the twenty-first century. *Procedia-Social and Behavioral Sciences*, 1(1), 1709-1716.

- Dunlap, J. C., & Lowenthal, P. R. (2013). Learning, unlearning, and relearning: Using Web 2.0 technologies to support the development of lifelong learning skills. In *IT policy and ethics: Concepts, methodologies, tools, and applications* (pp. 170-193). IGI Global
- EC (European Commission). (2002). *European report on quality indicators of lifelong learning*. Brussels: EC.
- European Commission (EC). (2006). *Adult learning: It's never too late to learn*. Brussels: European Commission.
- OECD (Organisation for Economic Cooperation and Development). (1996). *Lifelong learning for all*. Paris: OECD.
- Goldberg, J. M., Sklad, M., Elfrink, T. R., Schreurs, K. M., Bohlmeijer, E. T., & Clarke, A. M. (2019). Effectiveness of interventions adopting a whole school approach to enhancing social and emotional development: A meta-analysis. *European Journal of Psychology of Education, 34*(4), 755-782.
- Hargreaves, L. G. (2008). The whole-school approach to education for sustainable development: From pilot projects to systemic change. *Policy & Practice: A Development Education Review, 6*, 69–74.
- Hewitt, A. (2012). Give me a fish or teach me to fish? Developing law students' capacity for lifelong learning. *Alternative Law Journal, 37*(4), 259–263.
- Hui, S. K. F., Tsui, K. T., & Lee, J. C. K. (2019). Adaptation and co-construction: An investigation of Macau's small class teaching policy. *Journal of Education and Human Development, 8*(2), 181-192.
- International Labor Organisation (ILO; 2004). HRD Recommendation No.195: *Human Resources Development: Education, Training and Lifelong Learning*. Geneva.
- Jasna, M. (2021). Partnership Between Teachers and School Counsellors for Quality Learning and Work in the Community. *International Journal of Cognitive Research in Science, Engineering and Education, 9*(2), 147–159.
- Jones, M., & McLean, K. (2018). Mindsets for lifelong learning. In personalizing learning in teacher education (pp. 71–85). Springer, Singapore.

- Lee, J. C. K., Cheung, C. H. W., & Li, M. Y. H. (2019). Life planning education and life education: Lifelong learning perspectives. *Hong Kong Teachers' Centre Journal*, 18, 57-77.
- Lüftenegger, M., Finsterwald, M., Klug, J., Bergsmann, E., van de Schoot, R., Schober, B., & Wagner, P. (2016). Fostering pupils' lifelong learning competencies in the classroom: evaluation of a training programme using a multivariate multilevel growth curve approach. *European Journal of Developmental Psychology*, 13(6), 719-736.
- Longworth, N. (2003). *Lifelong learning in action: Transforming education in the 21st century*. Routledge.
- Macintyre Latta, M., Buck, G., & Beckenhauer, A. (2007). Formative assessment requires artistic vision. *International Journal of Education & the Arts*, 8(4), 1-23.
- Malan, M., & Stegmann, N. (2018). Accounting students' experiences of peer assessment: A tool to develop lifelong learning. *South African Journal of Accounting Research*, 32(2-3), 205-224.
- Miller, L., & Wu, J. G. (2018). From structured to unstructured learning via a technology-mediated learning framework. *EAI Endorsed Transactions on e-Learning*, 5(17), 5.
- Ministry of Education (2019). *Learn for Life — Remaking Pathways*
<https://www.moe.gov.sg/microsites/cos2019/assets/infographics/remaking-pathways/COS2019.pdf>
- Ministry of Education (2022). *Education in SG*. <https://www.moe.gov.sg/education-in-sg>
- Ng, B. (2016). Towards lifelong learning: Identifying learner profiles on procrastination and self-regulation. *New Waves-Educational Research and Development Journal*, 19(1), 41-54.
- Ng, B. (2019). Identifying the profile of a potential lifelong learner. *New Waves-Educational Research and Development Journal*, 22(1), 1-13.
- Ng, B. (Ed.). (2022a). *Higher Education and Job Employability* (Vol. 10). Springer Nature.
- Ng, B. (Ed.). (2022b). *Graduate Employability and Workplace-based Learning Development: Insights from Sociocultural Perspectives*. Springer Singapore.
- Ng, B., & Latife, A. (2022). Exploring students' learning and motivation in a lesson study for learning community (LSLC) environment: A new perspective. *International Journal for Lesson & Learning Studies*, 11(3), 193-204.

- Ng, B. L., Liu, W. C., & Wang, J. C. (2016). Student motivation and learning in mathematics and science: A cluster analysis. *International Journal of Science and Mathematics Education, 14*(7), 1359-1376.
- Ng, B., Liu, W. C., & Wang, C. K. (2015). A preliminary examination of teachers' and students' perspectives on autonomy-supportive instructional behaviors. *Qualitative Research in Education, 4*(2), 192-221.
- Ng, B., Tan, S. C., Quek, C. L., Looker, P., & Koh, J. (2020). Exploring the relationships of factor measures in blended learning environments. In *Transforming Teaching and Learning in Higher Education* (pp. 205–223). Springer, Singapore.
- Panadero, E., Broadbent, J., Boud, D., & Lodge, J. M. (2019). Using formative assessment to influence self-and co-regulated learning: the role of evaluative judgment. *European Journal of Psychology of Education, 34*(3), 535-557.
- Pendergast, D., Flanagan, R., Land, R., Bahr, M., Mitchell, J., Weir, K., ... & Smith, J. (2005). Developing lifelong learners in the middle years of schooling: A report about the practices, processes, strategies and structures that best promote "lifelong learning" and the development of "lifelong learners" in the middle years of schooling. Ministerial Council on Education, Employment, Training and Youth Affairs (NJ1).
https://www.researchgate.net/publication/257142583_Developing_Lifelong_Learners_in_the_Middle_Years_of_Schooling
- Roche, S. (2015). "We don't need no education": The radical implications of lifelong learning. *International Review of Education, 61*(1), 1–6.
- Schuetze, H. G. (2006). International concepts and agendas of lifelong learning. *Compare, 36*(3), 289–306.
- Stewart, D. (2001). Reinterpreting the learning organization. *The Learning Organization, 8*(3/4), 141-52.
- Su, Y. H. (2007). The learning society as itself: Lifelong learning, individualization of learning, and beyond education. *Studies in Continuing Education, 29*(2), 195–206.

- Sun, Q. (2012). The Confucian learning: Learning to become fully human. In P. Jarvis (Ed.), *The Routledge international handbook on lifelong learning* (pp. 475–485). London and New York: Routledge.
- Taranto, D., & Buchanan, M. T. (2020). Sustaining lifelong learning: A self-regulated learning (SRL) approach. *Discourse and Communication for Sustainable Education*, 11(1), 5–15.
- UNESCO. (1984). *Terminology of technical and vocational education*. Paris: UNESCO.
- UNESCO. (2016). *Unpacking sustainable development goal 4 education 2030 guide*.
<http://unesdoc.unesco.org/images/0024/002463/246300E.pdf>
- Wals, A. E., & Benavot, A. (2017). Can we meet the sustainability challenges? The role of education and lifelong learning. *European Journal of Education*, 52(4), 404-413.
- Webb, S., Holford, J., Hodge, S., Milana, M., & Waller, R. (2019). Conceptualizing lifelong learning for sustainable development and education 2030. *International Journal of Lifelong Education*, 38(3), 237-240.
- Wehmeyer, M. L., Shogren, K. A., Toste, J. R., & Mahal, S. (2017). Self-determined learning to motivate struggling learners in reading and writing. *Intervention in School and Clinic*, 52(5), 295-303.