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Enacting Learning Agency Through ePortfolio Implementation: An Exploratory Study

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ePortfolios have emerged as a potential tool for enacting agentic learning, allowing learners to document and demonstrate their learning. However, there is a gap in investigating students' enactment of agency resources while implementing ePortfolios. To address this, this study investigates the impact of ePortfolios on promoting learner agency among high school students. By employing a mixed-methods strategy, this research examines how ePortfolios enhance the contextual, relational, and individual domains of learner agency. The study includes a group of 34 students from an international school in Hong Kong. It utilizes an ad-hoc survey, based on the agency concept underlying the Agency of University Students (AUS) Scale, that includes both rank-order items and open-ended items. The purpose of the research is to explore the influence of ePortfolios on agentic learning. The results suggest that ePortfolios significantly improve learner agency at an individual level, promoting active participation, competence beliefs, and more profound and meaningful engagement with the learning content. Besides, the value of peer support was highlighted in the relational dimension, and in the contextual dimension, opportunities to influence and active participation are most evident. This study emphasizes the importance of ePortfolios in facilitating active and reflective learning. Conclusions also highlighted the importance of promoting student agency during ePortfolio-facilitated learning by addressing various factors of agency resources in individual, contextual, and relational domains. The recommendations for enacting learners' agency in ePortfolio implementation were also provided.

Learner agency, integral to the educational narrative, epitomizes the capacity of learners to orchestrate their learning journey, which encapsulates pivotal aspects such as self-regulation, goal setting, decision-making, self-monitoring, and reflective thinking (Reeve, 2013; Schunk & Zimmerman, 2011), characteristics fundamental to academic success (Code, 2020). This notion aligns with the perspective that learner agency is a multidimensional phenomenon intricately linked to individual and collective components of learning, power, and control (Eteläpelto et al., 2013). The capacity for self-directed, proactive engagement in learning is not just central to self-regulated learning but also resonates with contemporary educational paradigms aimed at fostering student engagement, intrinsic motivation, and self-efficacy (Schunk & Zimmerman, 2011).

In the evolving landscape of educational technology, ePortfolios have emerged as an important tool for promoting agentic learning and enhancing learning agency by facilitating learner autonomy and providing a means to track and reflect on educational growth (Sarwandi et al., 2022). These digital platforms provide a medium for learners to document, reflect upon, and showcase their learning journey, thereby facilitating a reflective and integrative learning experience (Castañeda & Tur, 2020; Zhang & Tur, 2022). ePortfolios, characterized as digital collections of authentic and diverse learning evidence (Mummalaneni, 2014), enable learners to direct their learning, a core aspect of learner agency (Tong & An, 2022). These platforms support the development of self-directed learning skills, including self-evaluation, goal formulation, and selection of future learning tasks, thereby fostering self-monitoring and evaluation, and enabling learners to share and reflect on their learning (Beckers et al., 2016; El-Senousy, 2020; Yamaguchi, 2011; Yastibas & Cepik, 2015).

Despite the recognition of ePortfolios as valuable tools for enhancing learning agency, there is a discernible gap in understanding how they can be optimally utilized to measure and evaluate learner agency, a multifaceted and complex construct (Jääskelä et al., 2017). Specifically, there is a need for studies that delve into how students perceive and enact different sources of agency when engaging with ePortfolios in their learning journey (Zhang & Tur, 2023).

To address this research gap, we designed the current study to dissect the nuances of learner agency in the context of ePortfolio use. We seek to identify the specific dimensions of agency that learners engage with and to refine ePortfolio practices to better support agentic learning. Nonetheless, assessing learner agency is difficult, as it requires measuring what learners know, how they approach their learning, and the extent to which they adopt an active and self-directed approach (Jääskelä et al., 2017). Addressing the complexity of assessing learner agency, this study adopts a combination of choice-based and open-ended questionnaires, informed by the Agency of University Students (AUS) Scale (Jääskelä et al., 2017, 2023), to capture nuanced aspects of students' agentic engagements in ePortfolio learning contexts. A qualitative descriptive approach underpins this research, leading to the formulation of two primary research questions:

- What dimensions of learning agency are enacted through ePortfolio use?
- What manifestations of agency resources are evident in the ePortfolio-based agentic learning environment?

Literature Review

Learner Agency and Agentic Learning

Learner agency is inherent in a student's capability to regulate, control, and monitor their own learning, and it is fundamental to their academic success (Code, 2020). According to Eteläpelto et al. (2013), agency is a complex phenomenon encompassing both individual and collective components and is closely connected to power and control. They presented a theoretical framework for comprehending agency that consists of three dimensions: the capacity to act, the intentionality of action, and the reflexivity of action (Eteläpelto et al., 2013). Agentic learning is the learning process in which learners' agency is promoted by enabling them to take ownership of their educational experience and make conscious choices to attain their learning objectives (Code, 2020). In this learning setting, learners are required to be autonomous, proactive, and reflective during learning (Code, 2020). Learners with a higher sense of agency can identify their own needs, establish objectives, and take steps toward achieving those objectives. In addition, they can adapt to changing circumstances and take responsibility for their own learning outcomes (Code, 2020; Eddy, 2021). An essential aspect of learner-centered education is agentic learning (Eddy, 2021). Learner-centered education emphasizes learner agency and autonomy throughout the learning process. It acknowledges that learners have diverse needs, interests, and learning preferences, and learn most effectively when actively engaged in the learning process (Fletcher, 2016).

Multiple methods, such as agent-based learning support systems, have been shown to promote agentic learning (Peng, 2008). These systems use agents to adjust to meet the needs of learners, facilitate collaboration between learners, and make the system accessible. The agents can undertake various positions, such as tutor, mentor, motivator, expert, or peer student, and can influence various aspects of learning, including cognitive, affective, and metacognitive processes (Krishna et al., 2019). In this study, teachers and peer students are the agents in the learning process enabled by ePortfolios.

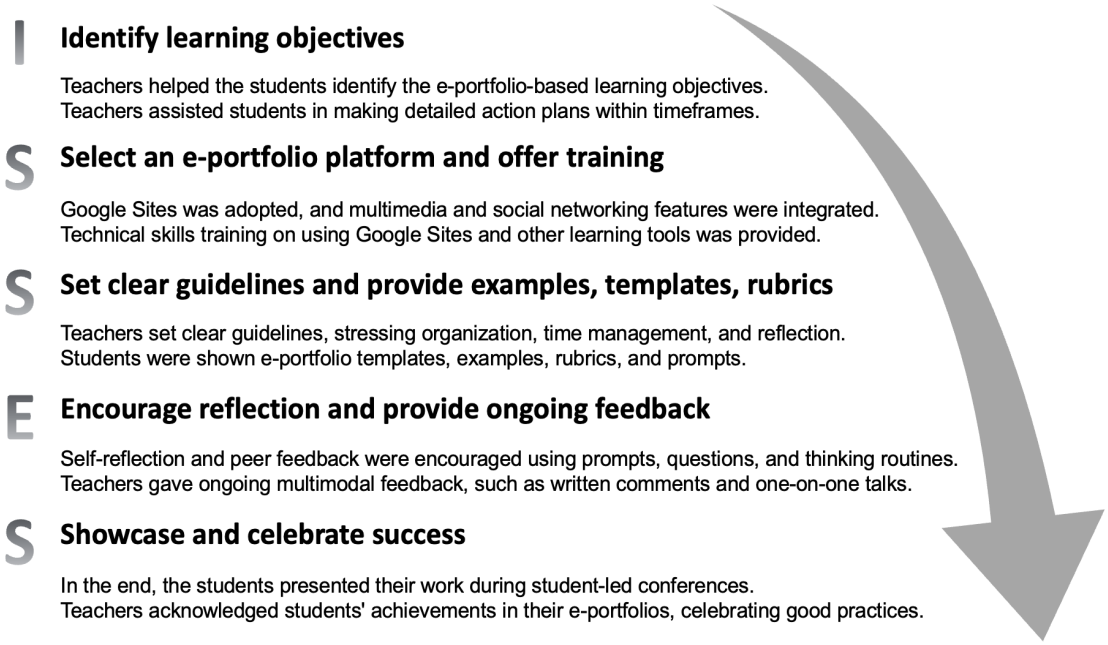
ePortfolio's Potential in Agentic Learning

Learner agency is a vital component of education, and ePortfolios can be a useful and valuable tool for fostering learner agency (Sarwandi et al., 2022; Tong & An, 2022). An ePortfolio is a digital compilation of authentic and diverse learning evidence derived from a more extensive archive that represents what a person has learned over time, reflects on, and is intended to showcase to one or more audiences for a particular rhetorical purpose (Mummalaneni, 2014). The use of ePortfolios can enable students to direct their own learning, which is a fundamental aspect of learner agency (Tong & An, 2022). ePortfolios can be used to facilitate the development of self-directed learning skills, such as self-evaluation of performance, formulation of learning objectives, and selection of future learning tasks (Beckers et al., 2016). They can help students self-monitor, self-evaluate, and share what they have learned, leading to better learning in future endeavors (Yamaguchi, 2011). Besides, ePortfolios can be applied to monitor student progress and enhance educational output (Tong & An, 2022). It can aid students in reflecting on their comprehension, resulting in a deeper grasp of the content (Tong & An, 2022). Also, an ePortfolio is a form of authentic assessment with formative features, such as showcasing and sharing learning artifacts, documenting reflective learning processes, connecting learning across multiple phases, and encouraging frequent feedback for growth (Yang et al., 2016).

The use of ePortfolios can also promote learner autonomy, which is another important aspect of learner agency (Yamaguchi, 2011). ePortfolios have become more prevalent in learning and student assessment because of the need for educators to foster student autonomy (Ghany & Alzouebi, 2019). ePortfolios enable students to reflect on their own learning process, promote collaborative and cooperative student work, and encourage feedback (Ghany & Alzouebi, 2019). Besides, an ePortfolio is not only a powerful tool for demonstrating evidence of learning and achievements, contributing to the enhancement of educational practices, but also an innovative platform that can be incorporated into the teaching and learning process to develop students' soft skills, including creativity, digital literacy, and critical thinking (Zain & Sailin, 2019). Consequently, an ePortfolio can be a valuable tool for agentic learning, emphasizing the learner's active role in the learning process and developing skills for self-directed learning (Beckers et al., 2016).

Research in ePortfolios about students' agency enactment is normally carried out using general approaches in which agency is addressed as autonomous and independent learning without a closer analysis of its nuances (e.g., El-Senousy, 2020; Yastibas & Cepik, 2015). According to Yastibas and Cepik (2015), ePortfolios require students to organize and produce content for a specific purpose, assess their work, and reflect on the results regarding their learning process, experiences, and skills. This allows students to assume responsibility for their learning and encourages

Figure 1
The ePortfolio Learning Design



them to be motivated. Similarly, El-Senousy (2020) asserted that ePortfolios can promote self-reflection and assist students in developing specialized competencies. As observed in previous research, agentic skills can be enacted through learning; however, there is still a need for greater work to understand under which conditions and with the support of which resources students' agency in ePortfolio-based learning can be promoted.

Method

The Learning Design

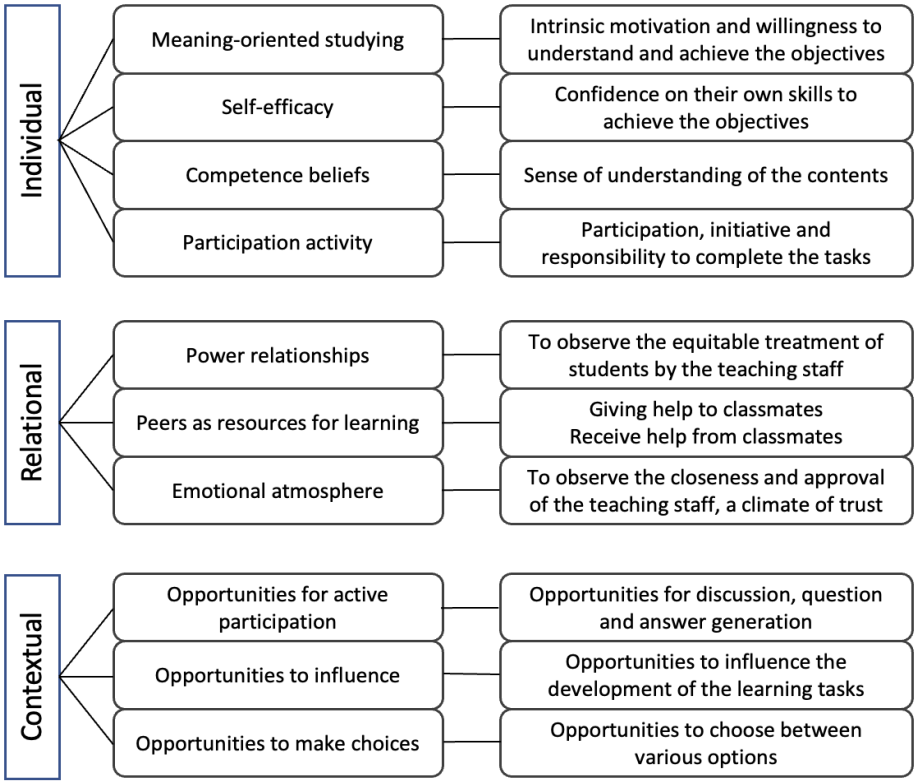
The present study was conducted over the course of a semester. It included ePortfolios implemented in various required subjects, including STEM, humanities, science, English, modern languages, art, music, drama, service learning, and some elective courses. Drawing upon Zhang and Tur's (2022) synthesized recommendations for effective ePortfolio implementation, the learning design was structured around five key components, as illustrated in Figure 1. The students were engaged in multiple learning tasks, including mini projects, essays, presentations, process journals, artifacts, research work, and reading logs, using ePortfolios to record, monitor, and reflect on their learning progress:

Instrument

Adopting an interpretivist paradigm with exploratory objectives, this study employed a mixed methods approach to gather both quantitative and qualitative data. To explore the learners' agency in this study, a survey was developed and implemented that included rank-order and open-ended items under each resource domain of learners' agency (see Figure 2). The AUS Scale inspired the design, which adhered to the description based on domains and dimensions and included general examples to be holistic but manageable. The AUS Scale is an instrument with a multidimensional structure developed for assessing the course-specific agency of students in higher education across disciplines (Jääskelä et al., 2017, 2023), evaluating the contextual, relational, and individual sources of agency (Jääskelä et al., 2017, 2023). It has good psychometric properties and has been validated in both Finland (Jääskelä et al., 2017, 2023) and Spain (Jääskelä et al., 2023).

In this study, an ad-hoc survey was built based on the framework of the AUS Scale to adapt to the context of secondary education and emphasize a qualitative approach. Given that this research concentrates on the agency of senior high school students transitioning to higher education, it is meaningful to investigate the resource dimensions of their agency and the effect of ePortfolio use on leveraging their agency. The instrument comprised a balanced mix of rank-order and

Figure 2
Domains of Learner Agency



Note. Adapted from "Assessing agency of university students: Validation of the AUS Scale," by P. Jääskelä et al., 2017, *Studies in Higher Education, 42*(11), 2061-2079. CC BY-NC.

open-ended items, based on previous research in k-12 (Bartholomew & Reeve, 2018), in which questions to facilitate students' answers by ordering different options were mixed with others for self-report in a freer way. Questions were crafted to resonate with the resource domains of learners' agency. We designed the items to elicit detailed responses pertinent to the study's research questions and objectives. Considering the participants' background and language preferences, the survey was English-Chinese bilingual to ensure all participants understood the instruction and content well. The instrument's structure and sample items are presented in the Appendix.

The survey was divided into three main sections:

- Introduction and Consent: Provided an overview of the study's objectives and sought participant consent.
- Personal Information: Gathered demographic data such as grade, age, and subjects involved.
- Agency Resource Domains: Featured a series of rank-order and open-ended items aimed at exploring the participants' agency in relation to their use of ePortfolios. The items were designed to allow participants to reflect on how ePortfolios influenced their intrinsic motivation, effort, sense of ability, participation, initiative, and responsibility (i.e., individual agency), interactions with peers and teachers (i.e., Relational Agency), and engagement with various learning opportunities (i.e., contextual agency; Jääskelä et al., 2017, 2023).

The individual domain (Jääskela et al., 2017) includes some of the self-regulated skills for learning, like having the intrinsic motivation to learn, which is the willingness to participate because of internal, personal interest in and value for the learning. Also, the individual domain includes the competence beliefs to understand the content/learning aims, whereas self-efficacy is about the learner's confidence in his/her own skills to achieve learning aims (Schunk & Zimmerman, 2011). The relational domain includes the peers who support learning, the relationships, the

diverse stakeholders, and the affective atmosphere (the climate of trust and caring in class). The contextual domain includes the opportunities to participate and influence the development of the group, along with the facilities to make choices.

Each domain section prompted participants to prioritize options and provide justifications, encouraging in-depth reflection and elaboration on their experiences with ePortfolios. The survey concluded with an open section for additional comments, allowing participants to share insights beyond the structured items.

Participants

The study involved 34 participants who were high school students in grades 10-12, aged 15-18 years old, and attending an international school in Hong Kong. A total of 41 students were involved in the ePortfolio learning activities, but only 34 of them responded to the surveys. The participants all participated in the research voluntarily and contributed to it without force or pressure. Furthermore, prior to the start of the study, the participants were fully informed about the research's purpose and objective, as well as what their involvement included. They were also allowed to ask questions and clarify any misunderstandings before agreeing to participate. The procedure for gathering consent from participants was carried out in compliance with the ethical guidelines and regulations guiding human subject research. Participants were also guaranteed confidentiality, and any identifying information that may be used to link them to the study was treated confidentially.

Data Collection

The data for this study were gathered from participants following the implementation of the ePortfolio-empowered learning experience. This study lasted one semester and was carried out at the school where the participants were enrolled. At one of their self-study sessions, the participants were asked to complete questionnaires to gather information. This form of data collection allowed participants to respond in a comfortable and familiar setting, which may have resulted in more accurate and trustworthy results. The items in the survey were presented in a bilingual manner, in Chinese and English; the participants were also allowed to respond in their native languages. Most participants answered in English, and only three answered in Chinese. Finally, all 34 responses were translated into English for data analysis.

Data Analysis

After collecting the data, we conducted a thorough analysis using both Excel and NVivo software. This section details the steps and methodologies involved in the data analysis process to ensure clarity and reproducibility.

Quantitative Analysis

For the quantitative analysis, participants' selected agency resources in their ePortfolio-based learning journey were assessed using descriptive statistics in Microsoft Excel. The frequency and percentage of each selected resource were calculated to determine the most and least common agency resources utilized by the participants.

Qualitative Analysis

A qualitative analysis was conducted on the participants' written comments reflecting their perspectives on their agency addressed in the ePortfolio implementation process. The written responses were imported into NVivo, a qualitative data analysis software, for coding and thematic analysis. The researchers followed a three-step process for the qualitative analysis (Corbin & Strauss, 2014):

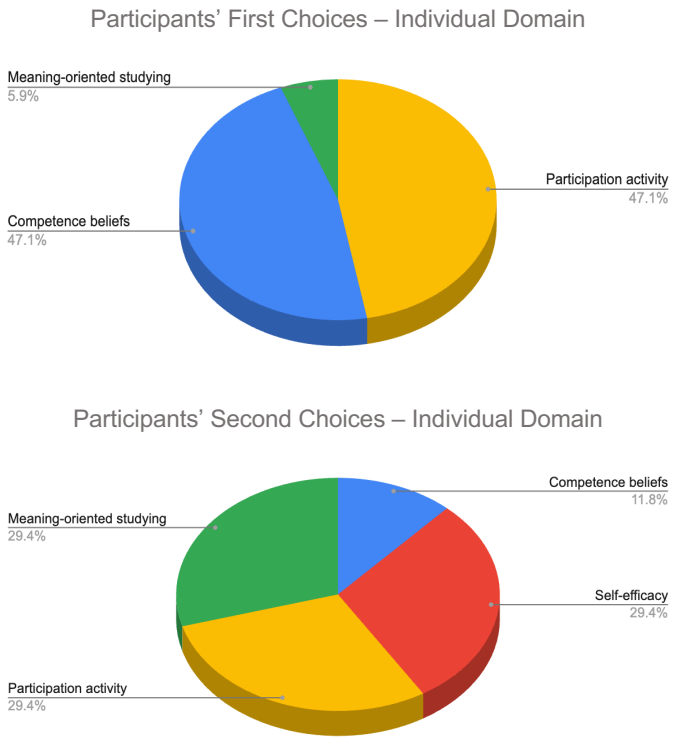
- Open coding: The written responses were read thoroughly, and initial codes were assigned to relevant text segments that captured key concepts or ideas related to participants' agency.
- Axial coding: The initial codes were reviewed, and similar codes were grouped together to form categories or themes. The categories were discussed and refined to ensure they accurately represented the participants' perspectives.
- Selective coding: The categories were further analyzed to identify the core themes that encompassed the participants' views on their agency enacted while using ePortfolios in the learning environment. Hierarchy charts were generated to visualize the number of coded references in each domain, providing a clear overview of the most prominent themes.

The quantitative and qualitative results were then compared and integrated to provide a comprehensive and accountable view of the participants' perspectives on their agency in the context of ePortfolio use. This mixed methods approach allowed for a deeper understanding of the participants' experiences and the factors that influenced their agency in the learning environment. By triangulating the findings from both the rank-order data and the written responses, we aimed to enhance the credibility and trustworthiness of the study's conclusions.

Results

Quantitative and qualitative results related to both research questions are presented in an integrated way

Figure 3
Individual Domain Pie Charts



according to the main themes that emerged: the individual, relational, and contextual domains of learners' agency.

Individual Domain

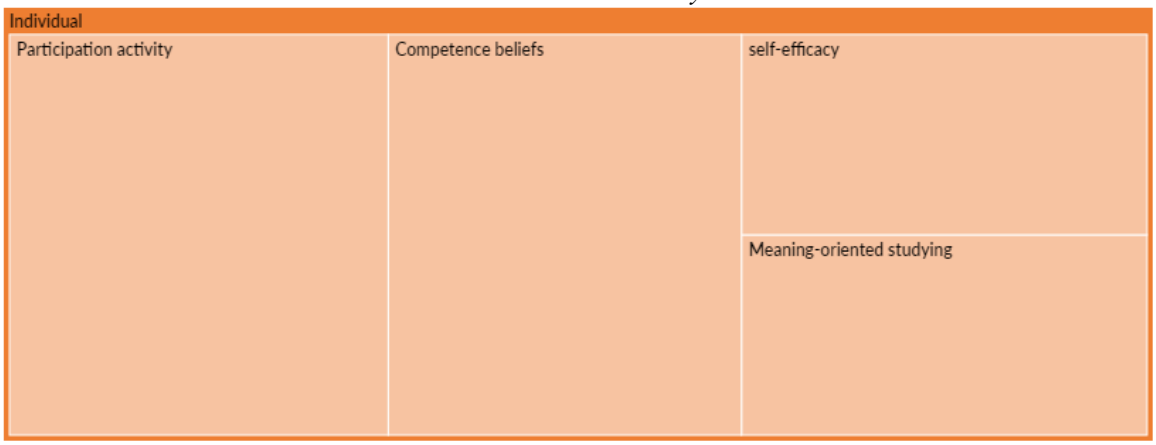
Figure 3 exhibits the participants' first and second choices of their resources for learning agency in the individual domain of agency. The participants' first choices were mainly participation activity (47.1%) and competence beliefs (47.1%); some also chose meaning-oriented studying (5.9%). Regarding their second choice, the choices of different agency resources in the individual domain are distributed more evenly. Apart from competency beliefs (11.8%), the choices in the remaining subcategories of learner agency, meaning-oriented studying, participation activity, and self-efficacy in the individual domain remain the same (29.4%).

The result in the hierarchy chart (see Figure 4) also indicated that participation activity is the most mentioned in students' written responses, with 30 references, followed by competence beliefs, with 28 references. The participants also identified self-efficacy and meaning-oriented studying, each with 16 references.

From participants' detailed written responses, we identified the following ePortfolio learning activities relating to participation activity: tracking learning progress, reflection, and learning evidence collection. The participants claimed that using the ePortfolio to document their learning progress and organize their previous work enabled them to take ownership of their learning. The possibility of creating their own ePortfolio to showcase their work and collect evidence of learning gave them a sense of control and ownership over their learning process. The ePortfolio also served as a reflective instrument that encouraged students to enhance their work through increased effort. For example, some excerpts of the participants' responses include: (a) "I can use it to track my learning progress and be responsible for my own learning," (b) "I can design my own ePortfolio to display my work and gather learning evidence," and (c) "The progress shown in the ePortfolio lets me reflect and work harder to improve upon it."

Participants' competence beliefs mainly lie in knowledge construction, learning development, and revision. Students stated that utilizing the ePortfolio to organize and reflect on what they learned helped them increase their comprehension and construction of

Figure 4
Individual Domain Hierarchy Chart



knowledge. They valued the opportunity to summarize what they had learned and update their ePortfolio, which helped them better understand the learning topic. Furthermore, the ePortfolio acted as a review tool, assisting students in retaining and applying their knowledge over time. For example, participants noted, "I can organize the things that I learned and reflect on what I learned, which can help me strengthen my understanding and build knowledge"; "I can summarize and review what I have learned"; and "[I] know better about the learning content while updating the ePortfolio."

Participants' self-efficacy in the ePortfolio-empowered learning journey reflects on various aspects, including self-confidence as a learner in achieving good learning results, addressing learning objectives, and readiness for challenges along the way. The participants reported that using ePortfolios helped them build a sense of confidence and belief in their learning abilities, which helped them succeed. They believed that if they worked diligently on their ePortfolios, they could achieve good grades and succeed in their studies. Students' confidence in accomplishing their learning objectives was bolstered by the collection of learning evidence, which allowed them to monitor their progress and view evidence of their learning. In addition, the electronic process journal served as a tool for reflection, which assisted students in overcoming learning obstacles and commenting on and criticizing their own work. For example, students wrote the following responses: (a) "If I work hard on my ePortfolios, I can get good grades"; (b) "The collection of learning evidence makes me confident in achieving the objectives"; and (c) "With my work being recorded in the process journal, I can reflect on my own work, overcome learning difficulties, and make comments and criticism on my work."

When it comes to meaning-oriented studying, participants address motivation, particularly intrinsic motivation, in their written responses. As the participants mentioned, using ePortfolios motivated them to work and helped them experience a sense of accomplishment as they completed tasks individually. They also reported that the inclusion of technology increased motivation and that the ability to monitor their progress in an organized manner provided them with a sense of purpose and direction. In addition, the students viewed the ePortfolio as a means to demonstrate their learning journey, which motivated them to continue pursuing their objectives. For instance, the students articulated their thoughts in the following ways: (a) "It gives me motivation to work because I enjoy the feeling of getting things done one by one; high-tech gives me motivation"; (b) "It can be proof of getting to the end of the unit step by step, letting people know how I get to the end, which motivates me to push forward"; and (c) "It kept me more organized with everything that I am learning, allowing me to have more motivation to acquire knowledge."

Relational Domain

In the relational domain of learning agency, as shown in Figure 5, peers as resources for learning were dominantly highlighted by participants in both their first and second choices (73.3%). Some participants chose items that fell into an affective atmosphere in their first (26.7%) and second choices (20%). The participants least mentioned power relationships: only 6.7% of the participants reflected on them in their second choice.

Similar patterns are notable in the hierarchy chart (Figure 6), which illustrates the frequency of themes identified in the students' qualitative responses. The most prominent theme was peers as resources for

Figure 5
Relational Domain Pie Charts

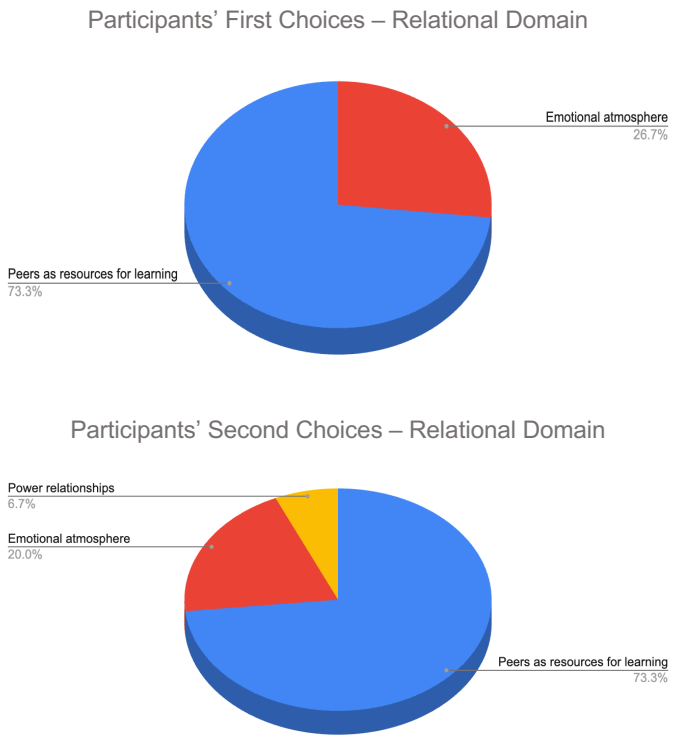


Figure 6
Relational Domain Hierarchy Chart

learning, with 32 coded references. The second most common theme was the emotional atmosphere, with 14 coded references. Lastly, power relationships were mentioned six times.

In the written responses concerning peers as resources for learning, we identified reciprocal peer support. It includes seeking help from other classmates and offering support to their learning peers through questioning, observing others' work, giving suggestions, and offering technical support while using ePortfolios. According to the participants, there is evidence that classmates can serve as learning

resources, as they can provide valuable feedback and inspiration for ePortfolio creation. Participants perceived that they could reference and learn from the ePortfolios of their peers, which can assist them in gaining a deeper understanding of certain topics. They also mentioned that having all their work on one site makes it easy for their classmates to view, which can facilitate peer feedback and support. In addition, students indicated that they could assist their classmates in the construction of ePortfolios, which can foster collaboration and knowledge sharing among students. Students responded with these statements: (a) "I can check other students' work and get inspired so that I can gain a better understanding of a topic"; (b) "I can help my classmates with ePortfolio making since I am more familiar with it"; and (c) "Our work being in one place allows our classmates to observe our work easily, allowing them to give us help when needed."

For the emotional atmosphere, the participants emphasized teachers' support, approval, and approachability in the cultivation of a safe, trusting, caring, and collaborative learning environment. Support, feedback, and collaboration were found to be the key elements in students' answers to the emotional climate in the ePortfolio-facilitated learning experience. According to the qualitative data analysis, students perceived a positive emotional atmosphere in the relational dimension of their learning agency. The participants reported receiving a great deal of support from their teachers, which they found to be highly beneficial, particularly when the teachers provided multiple comments on their ePortfolios, thereby increasing the level of interaction. The teachers' approval and review of the students' work demonstrated that they cared about the students' work, thus further fostering a caring environment. Furthermore, sharing ePortfolios among classmates and collaboration led to a collaborative and secure learning environment, thereby improving the emotional atmosphere. To demonstrate, here are some of the students' responses: (a) "I received lots of support from teachers. Teachers' feedback helps me a lot. Teachers can give numerous comments on ePortfolios; hence, interaction will increase. I really appreciate that." (b) "The teacher's approval and review of our work shows that they care about our work, creating a caring environment." Also, (c) "The ePortfolios are all shared among our classmates, and we collaborate a lot. I feel like the learning environment is collaborative and safe."

Power relationships are an essential source of agency in relational domains because they determine who has the authority to make decisions, control resources, and exert influence over others. In this study, it is relatively rarely mentioned in the collected data. For the students who mentioned power relationships in their written elaborations, we discovered that the participants highlighted empowerment, relationships, and equity. Students mentioned that incorporating reflections and responding to instructor feedback could facilitate relationship building. In addition, they noted that the ePortfolio allowed them to observe how organized teachers are with their work and how they manage their responsibilities, which may influence their perception of the teacher's power and authority. In addition, students valued the ability to view the feedback that teachers provided to different students to determine if they were being treated equally, indicating that power dynamics are essential to them. The following are examples of responses given by students: (a) "Build relationships with teachers by adding reflections and responding to their feedback," (b) "Using the ePortfolio also allows students to see how organized the teacher is with their work and how they handle their responsibilities," and (c) "I can see teachers' feedback on different students to see if they treat us equally."

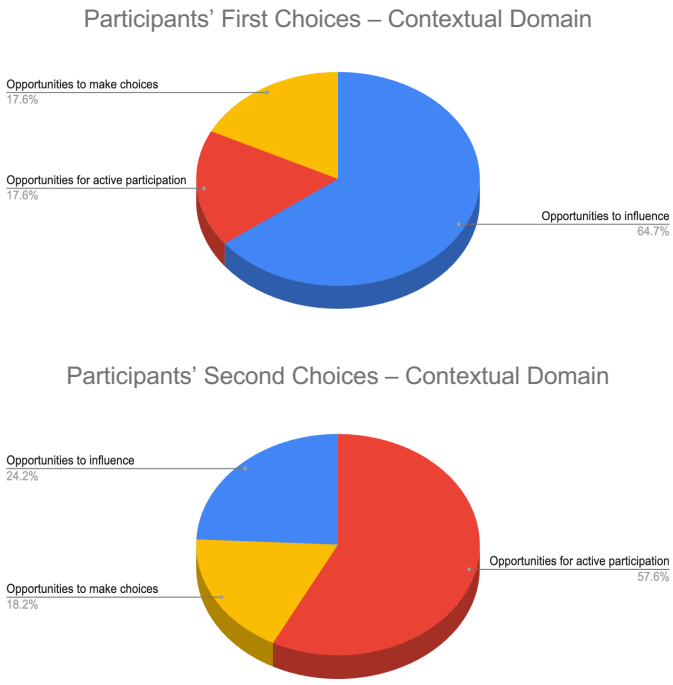
Contextual Domain

According to the pie chart (see Figure 7), most participants selected opportunities to influence as their first choice of the contextual domain of agency, with nearly two-thirds choosing this option. In contrast, 17.6% of participants chose the opportunity to make choices and opportunities for active participation as their first option. Interestingly, participants' second selections demonstrated a change in preference towards opportunities for active participation, with 57.6% choosing this category. Opportunities to influence, the most popular initial choice, was the second choice for 24.2% of participants. These findings imply that while opportunities to influence may be participants' first preference when assessing agency, the relevance of opportunities for active participation may become more apparent after further consideration.

Similarly, the hierarchy chart of the students' qualitative responses demonstrated that opportunities to influence was the code most frequently referenced by participants, with 28 references (see Figure 8). Opportunities for active participation was the second most referenced code, with 20 mentions in total. Finally, opportunities to make choices had the lowest number of references, with only 10. The comparatively low frequency of references to opportunities to make choices suggests that this domain may be less fundamental to participants' understanding of agency or may be perceived as less empowering than the other domains.

The opportunity to influence is a crucial dimension of the contextual resources of learner agency. The students' perceptions reflect that they can affect their own learning through self-direction, taking the initiative, process management, and tracking learning. Moreover,

Figure 7
Contextual Domain Pie Charts



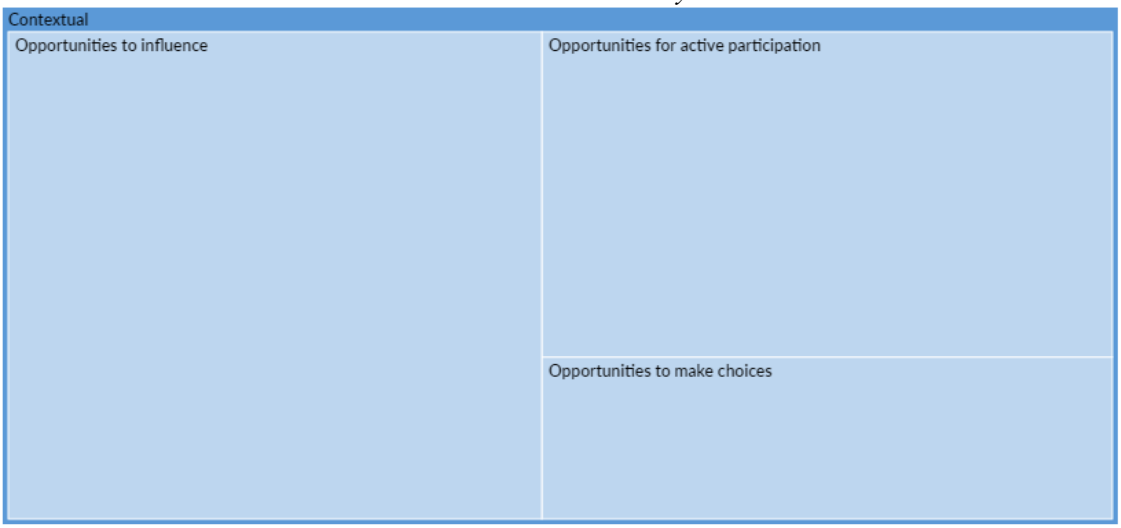
implementing ePortfolios positively influenced their learning outcomes and trained their skills, such as critical thinking. Illustratively, students conveyed their views through these responses: (a) "Our individualized learning through process journals allows us to direct our own learning." (b) "We can find what we want to study, what we want to put on our ePortfolios and track our learning. We can use it to review and achieve better learning results." (c) "The use of process journal trains my critical thinking." Also, (d)

> Through using an ePortfolio, I can understand the learning content better and have evidence of my learning. If I have any gaps in my knowledge, I would be able to spot them easier with the ePortfolio. It helps me gain more responsibility in learning.

The findings from data reflecting students' perceptions imply that opportunities for active participation are a crucial element of learning agency in the contextual domain. According to the students, participating in peer discussions, reflecting on their own work through learning journals and process journals, and collaborating with classmates to improve ePortfolio content all contributed to a deeper understanding and enhanced learning outcomes. These opportunities for active participation gave students a sense of autonomy by allowing them to take an active role in their own learning and engage in critical reflection and discussion. In addition, the ability to raise inquiries and seek support from peers and teachers through these activities highlights the relevance of social interactions and collaborative learning in fostering agency. To exemplify, students expressed their opinions as follows: (a) "The peer reflection part helped me a lot since I gained a deeper understanding of the topic through discussing it. I can discuss with my classmates how to make the ePortfolio content better." (b) "It helps me organize thoughts and ideas into a simple site for further discussion. With what we have learned all in one place, questions about the topic would be generated with more ease, leading to more discussion between classmates." Additionally, (c) "With my work being recorded in a process journal, I can reflect on my own work and make comments and criticisms on it."

The students' written responses reflected the opportunities to make decisions in agentic learning. The opportunity to choose their own learning pace and the content they wished to include in their ePortfolio gave students a sense of control and ownership over the learning process, as reported by students. They valued the flexibility enabled by these opportunities to choose, which they felt empowered them to demonstrate their own perspectives and approaches to

Figure 8
Contextual Domain Hierarchy Chart



their learning. The ability to select various development topics highlights the relevance of personalization and customization in cultivating agency. Students' written reflections can be seen in the following examples: (a) "I can be the master of my own learning and make choices based on my own learning pace"; (b) "I can choose whatever I want to put on my ePortfolio following the guidelines; it's flexible"; and (c)

> As I can choose different topics for me to develop on, even when the whole class has the same classes, but as we have different approaches to the same topic, creating an ePortfolio allows us to show what our approach to the unit is.

Discussion

The present research investigated the perspectives of learners on agency in implementing ePortfolios across three domains: individual, relational, and contextual. The findings reveal valuable information about the resources students believe are necessary for their agency in each domain. According to the findings of this study, students perceive their agency in ePortfolio implementation to be influenced by a variety of factors; the highly referenced ones include their own participation activities, competence beliefs, meaning-oriented studying, peer support, and opportunities to influence their learning environment. Previous research on agency has demonstrated that it is a complex concept impacted by individual and contextual factors (e.g., Jääskelä et al., 2017; Reeve & Jang, 2006).

Individual Domain

In the individual domain of agency, participation activity and competence belief were the most frequently cited resources for learning agency. This finding is consistent with previous research (Ryan & Deci, 2000), suggesting that students who actively participate in their learning and have confidence in their capacity for learning are more likely to experience a sense of agency. The findings suggest that incorporating participation activities into the learning process may strengthen students' agency by fostering self-regulation, self-motivation, and a sense of ownership over their own educational journey (Hagger & Hamilton, 2017). Participation activities enable students to interact actively with the learning materials and assume responsibility for their learning experience. Collaborative learning activities, such as peer work and project-based learning, are examples of participation activities that can have a positive effect on student achievement and agency (Balan et al., 2015).

Moreover, fostering competence beliefs and self-efficacy is a crucial part of leveraging learning agency, as it allows learners to control and master their own learning process and feel confident in their ability to acquire and successfully apply new knowledge, further enabling them to succeed in learning (Qudsyi et al., 2018). Academic achievement and motivation are positively correlated with self-efficacy beliefs, according to Qudsyi et al. (2018). Students with high competence beliefs are more likely to establish challenging learning objectives and persevere in the face of obstacles (Qudsyi et al., 2018). Thus, educators should help students develop these beliefs during the

ePortfolio implementation process by providing opportunities for success, offering constructive feedback, and motivating students to set ambitious and feasible objectives for themselves.

The findings also indicate that the use of ePortfolios can enhance students' sense of meaning and motivation in their learning. This is in accordance with the findings of Tosh et al. (2005), who determined that ePortfolios have lots of potential to motivate and engage students and facilitate deep learning. The fact that meaning-oriented studying was also designated as a source of agency in the study suggests that students' motivation and engagement in their learning process play an essential role in their sense of agency (Reeve, 2013). Also, this implies that students who perceive their learning as meaningful are more likely to experience a sense of ownership over it and to be motivated to actively participate in it (Reeve & Jang, 2006). In addition, the relatively even distribution of resources in the second option suggests that students may have a variety of options for enacting their agency in this domain during the ePortfolio implementation journey.

Unlike previous studies, which commonly reveal students' negative perspectives, such as doubts about their own abilities, lack of confidence, or the overwhelming workload that may hinder their motivation and willingness to participate (Tur et al., 2019), this research did not identify any such negative perceptions. This could be explained by the fact that the instrument prioritized enacting the concept of agency in ePortfolio learning rather than capturing students' own opinions of their ePortfolio learning experiences. Consequently, the previously reported negative opinions were not witnessed in this situation.

Relational Domain

In the relational domain of agency, the most prevalent first and second choices for learning agency were peers as resources, followed by the emotional atmosphere. It is implied that students may value the interpersonal relationships and emotional support they receive from classmates during the learning experience. This aligns with prior studies (Anderman & Wolters, 2007), indicating that collaboration with learning buddies is essential for promoting learners' agency. Peer collaboration is an educational approach currently employed to facilitate learning in classroom settings (Montgomery et al., 2015; Scott et al., 2013), and it is also extensively addressed in the implementation of ePortfolios (Ismailov & Laurier, 2021; Tur & Urbina, 2016; Zhang & Tur, 2022). Collaborative, peer-mediated learning activities contribute to developing deep learning approaches and establishing learning communities (Scott et al., 2013). Montgomery et al. (2015) argued that peer support strategies effectively empower students to step in and assist other classmates.

We discovered that the emotional atmosphere of the learning environment was also a relevant resource for learning agency, which suggests that students who feel supported and valued by their peers are more likely to develop an awareness of agency (Anderman & Wolters, 2007). Peers can play a vital role in supporting students as they learn through the creation of ePortfolios and emphasize the importance of fostering a collaborative and supportive learning environment in the classroom (Tur & Urbina, 2016); additionally, a positive emotional atmosphere in the relational domain can promote students' agency in their learning (Jennings & Greenberg, 2009). The relatively low representation of power relationships in this domain may suggest that students are unaware of their relationships with teachers or authority figures as notable agency resources. However, teacher impartiality in dealing with students should be considered as well to provide students with a sense of equity and fairness so that they can enact their agency more effectively (Jääskelä et al., 2017).

Contextual Domain

In terms of the contextual domain of agency, most participants chose opportunities to influence as their first choice, with opportunities for active participation coming in second. Recognizing that opportunities to influence were the most often mentioned resources for learning agency in the contextual domain corresponds with the assumption that students who feel they have a voice in their learning are more likely to consider themselves to have agency (Ryan & Deci, 2000). The revelation that opportunities for active participation were also a relevant resource for learning agency indicates that students who feel actively involved in their learning tend to feel a sense of ownership over it and have the incentive to participate actively in it (Reeve & Jang, 2006). Integrating opportunities for active participation into learning activities may strengthen students' agency and foster deeper learning (Ahshan, 2021).

Interestingly, opportunities to make choices were the least selected and discussed aspect of the contextual domain in this study. This finding contrasts with the work of Patall et al. (2010), which demonstrated that providing students with choices in their homework assignments led to increased intrinsic motivation, perceived competence, and academic performance. The discrepancy between the current study and Patall et al.'s (2010) findings may be explained by the high correlation between the constructs of opportunities to influence and opportunities to make choices. As making choices is a way to exert influence over one's learning context, students in this study may not have clearly differentiated between these two aspects of agency. The strong conceptual overlap between these constructs could have

led participants to prioritize opportunities to influence, as it encompasses the more specific act of making choices. This interpretation aligns with the recommendation made in the previous review, highlighting the potential difficulty in distinguishing between highly correlated constructs during data analysis.

Despite the lower emphasis on opportunities to make choices in this study, it is important to acknowledge the potential benefits of offering students choices in their learning, as demonstrated by Patall et al. (2010). Providing students with options and autonomy over their learning tasks can foster a sense of empowerment and intrinsic motivation, ultimately leading to improved academic outcomes. Future research could further explore the relationship between opportunities to influence and opportunities to make choices, as well as investigate strategies for effectively integrating both aspects of agency into learning environments.

Implications for Practice

This study provides valuable insights into the role of ePortfolios in promoting learner agency across multiple domains, including individual, relational, and contextual. The results indicate that ePortfolios function not just as a repository for evidence of learning but also as dynamic platforms that promote active involvement, competence beliefs, and a sense of connection with the learning material. The study consolidated the methods of promoting learners' agency in ePortfolio implementation, as depicted in Figure 9, leveraging the concept of agency dimensions in different resource domains (Jääskelä et al., 2017). The study has identified some specific implications and recommendations for practical application:

Individual Domain

- Active Participation and Competence Beliefs: The study demonstrated that active participation and a belief in competence are essential for cultivating a sense of agency. This aligns with the findings of Ryan and Deci (2000) and Reeve and Jang (2006). Consequently, educators should incorporate interactive activities such as project-based learning and collaborative tasks into the curriculum (Hagger & Hamilton, 2017). One possible approach is establishing collaborative projects where learners employ ePortfolios to record their learning progress and reflect on their learning experiences.
- Enhancing Meaning-Oriented Studying: Students valued the potential of ePortfolios to facilitate a deeper understanding and engagement with the learning content. Teachers should promote the use of ePortfolios among students to establish individual learning objectives and reflect on their educational progress, thus enhancing the relevance and intrinsic motivation of the learning experience.

Relational Domain

- Peer Support: The substantial importance of peers as resources for learning and acquiring knowledge underscores the importance of collaborative learning. To cultivate a collaborative learning environment, teachers could integrate peer review and feedback mechanisms into the ePortfolio implementation process. This may entail learners exchanging their ePortfolios with others to receive constructive comments, thus increasing learning through social interaction (Getman-Eraso & Culkin, 2017).
- Affective Atmosphere: The necessity for teachers to actively participate in the ePortfolio process is underscored by the positive affective environment created by teacher support, caring, and approval. Educators ought to consistently offer constructive feedback on students' ePortfolios and establish an inclusive classroom atmosphere that fosters a sense of value, caring, and support for students.

Contextual Domain

- Opportunities to Influence and Active Participation: The study reveals that students value the opportunity to participate actively and have a voice in their learning process. As demonstrated by Patall et al. (2010), offering students choices in their learning can enhance their sense of autonomy and agency. Teachers should provide learners with the opportunity to have ownership over their learning by allowing them to select the content for their ePortfolio. Furthermore, including features such as forums or group projects within ePortfolios can allow students to participate and engage actively.

In implementing these recommendations, educators and educational institutions can harness the full potential of ePortfolios, making them not just a tool for assessment but a powerful tool for enhancing learner agency during the learning process. By doing so, educators can create a more engaging, collaborative, and student-centered learning environment that prepares students academically and for future endeavors.

Figure 9
Approaches to Enacting Agency in ePortfolio Implementation

Individual Domain			
Meaning-oriented studying	Self-efficacy	Competence beliefs	Participation activity
Students and teachers set clear goals and expectations collaboratively. Students are motivated and enthusiastic for using e-portfolios to facilitate their learning. Teachers motivate students and encourage them to motivate each other continuously.	Students become confident and believe that they will use e-portfolios effectively. Students make efforts and be willing to overcome challenges in implementing e-portfolios.	Teachers help students develop a sense of understanding of how to use e-portfolios and collect learning evidence. Students are well-trained and feel competent in e-portfolio use. Self-reflection and self-assessment.	Implement e-portfolio collaboratively. Take the initiative in collaboration and discussion while using e-portfolio. Students actively track their learning, collect learning evidence in their e-portfolios. Students feel responsible for completing assigned learning tasks through e-portfolios.
Relational Domain			
Power relationships	Peers as resources for learning	Emotional atmosphere	
Teachers ensure treating each student equally and advocate equity and fairness in the e-portfolio implementation process. Teachers have regular check-in with students and give ongoing feedback on students' e-portfolios and develop a good student-teacher rapport. Teachers form a reciprocal relationship with students while using e-portfolios.	Students receive peer support and feedback from others during the e-portfolio-enabled learning journey. Students offer support and give feedback to other learning peers while implementing e-portfolio.	Teachers try to be approachable when students have questions about e-portfolio use and have an approving attitude toward students. Foster a trust and safe environment during e-portfolio implementation.	
Contextual Domain			
Opportunities for active participation	Opportunities to influence	Opportunities to make choices	
Teachers encourage students to collaborate and engage in discussion and collective meaning-making through co-constructing e-portfolio and peer feedback. Students actively participate in their own learning and collaborate with others during e-portfolio use continuously.	Students have a good sense of self-direction and affect their own learning. Students have opportunities to influence their own learning through self-reflection, self-assessment, and revision. Teachers respect students' perspectives and empower them to influence their own learning during e-portfolio practice.	Students can choose the e-portfolios design, learning collections, and showcase format based on their own thoughts, plans, and needs. Teachers give students opportunities to make choices to address their own e-portfolio development plan and learning.	

Limitations

While this study offers valuable insights into learner agency in ePortfolio implementation, it is important to acknowledge its limitations. First, the sample size of 34 participants from a single international school in Hong Kong limits the generalizability of the findings to other educational contexts. Future research should involve larger, more diverse samples from various educational settings to enhance the external validity of the results. Second, the study relied on self-reported data from surveys, which may be subject to response bias. Incorporating additional data sources, such as interviews or observations, could provide a more comprehensive understanding of learner agency in ePortfolio contexts and support further clarification. Finally, the study focused on a specific time frame (one semester) and did not explore the long-term effects of ePortfolio use on learner agency. Longitudinal studies could offer insights into how learner agency evolves over time in ePortfolio-based learning environments.

Conclusion

In summary, this study's findings indicate that students perceive their agency in ePortfolio

implementation to be influenced by a variety of factors in individual, contextual, and relational domains. Of these, the domains that seem mostly enacted are their own participation activities, competence beliefs, meaning-oriented studying, peer support, and opportunities to influence their learning environment. Furthermore, this study's findings have relevant implications for ePortfolio implementation and how educators might promote student agency and self-directed learning in the ePortfolio-empowered learning process. Educators can create ePortfolio learning environments that encourage student engagement, foster motivation, leverage social connectedness, and unpack opportunities for students to actively participate in the process of learning by understanding students' perceptions of agency resources in different domains. By doing so, educators may encourage students to take ownership of their learning and increase their sense of agency. These findings have broader implications for the design of ePortfolio-facilitated learning and for effectively using ePortfolios, which should be planned to promote student agency by facilitating various factors, including engagement, collaboration, and reflection.

Besides that, the results of this investigation suggest that future research should investigate the relationship between student agency and ePortfolio implementation in greater depth. For instance, future research could investigate the relationship between various dimensions of agency and different elements of ePortfolio use, such as the collaborative model, co-design, categories and quality of reflections, and satisfaction with ePortfolio use. Additionally, future research might investigate how this collaborative model might also influence the development of professional agency and, in this case, how the enactment of teachers' agency supports educational transformation (Corcelles-Seuba et al., 2022). Moreover, longitudinal studies could offer insights into how learner agency evolves over time in ePortfolio-based learning environments and support self-directed learning capabilities (Beckers et al., 2016; Tong & An, 2022), and future research should involve larger, more diverse samples from various educational settings to enhance the external validity of the results.

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Appendix
The Structure and Sample Items of the Survey

Section One:

Introduction
Consent Form
Therefore, I agree with participating in the study

- Yes, I agree.
- No. (Please leave the page)

Section Two:

Personal Information

- Grade
- Age
- Subject(s) involved (include all subjects)

Section Three:

1. The use of the e-portfolio has allowed me to implement: (choose two options in order of priority and give your reasons)

First of all,
Intrinsic motivation and willingness to understand and achieve the objectives
Effort and confidence to achieve the objectives
Sense of ability and understanding of the content
Participation, initiative, and responsibility to complete the tasks
Secondly,
Intrinsic motivation and willingness to understand and achieve the objectives
Effort and confidence to achieve the objectives
Sense of ability and understanding of the content
Participation, initiative, and responsibility to complete the tasks
Clarify/justify/elaborate on your option 1
Clarify/justify/elaborate on your option 2

2. The use of the e-portfolio has allowed me: (choose two options in order of priority and give your reasons)

First of all,
Observe the equitable treatment of students by the teaching staff
Give help to classmates
Receive help from classmates
Observe the closeness and approval of the teaching staff, a climate of trust
Secondly,
Observe the equitable treatment of students by the teaching staff
Give help to classmates
Receive help from classmates
Observe the closeness and approval of the teaching staff, a climate of trust
Clarify/justify/elaborate on your option 1
Clarify/justify/elaborate on your option 2

3. The use of the e-portfolio has allowed me to participate in: (choose two options in order of priority and give your reasons.)

First of all,
Opportunities for discussion, questioning, and answer generation
Opportunities to influence my own learning

Opportunities to choose between various options
Secondly,
Opportunities for discussion, questioning, and answer generation
Opportunities to influence my own learning
Opportunities to choose between various options
Clarify/justify/elaborate on your option 1
Clarify/justify/elaborate on your option 2

Other Comments.

End of the survey