# MIDDLE SCHOOL STUDENTS' EXPERIENCES OF ENGAGEMENT AND SELF-REGULATED LEARNING IN EDUCATIONAL INFORMATICS NETWORK (EIN)

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## ABSTRACT

This study investigates middle school students' engagement and self-regulated learning (SRL) experiences within the Educational Informatics Network (EIN). It specifically examines how using EIN influences changes in students' SRL and engagement levels. The study employed an intervention design and involved 60 purposively selected middle school students. Data were collected using the MOOC Engagement Scale, the Perceived Self-Regulation Scale, and semi-structured student interviews. Quantitative data were analyzed using dependent t-tests, while qualitative data were analyzed through deductive analysis. The results indicated a significant increase in students' SRL and engagement scores after the implementation. In particular, students developed several SRL strategies, including task management, time management, help-seeking, and self-evaluation. In addition, the findings indicated that students experienced behavioral, cognitive, affective, and social engagement, which were closely associated with their SRL development. Based on these findings, the study recommends improvements to the EIN platform to support students' engagement and self-regulated learning better.

**Keywords:** EIN, MOOC, engagement, behavioral engagement, cognitive engagement, social engagement, affective engagement, self-regulated learning.

## INTRODUCTION

Following the COVID-19 pandemic in 2019, the use of Massive Open Online Courses (MOOCs) increased significantly (Gan et al., 2022; Vilkova & Shcheglova, 2021). MOOCs enable individuals to learn from world-renowned experts and access high-quality course content (Shen et al., 2024). Designed for large groups, these courses are accessible from anywhere and promote educational equity by offering flexible learning opportunities without entry requirements or geographic barriers. Although the pandemic has largely subsided, it highlighted the need to improve the quality of online learning environments and develop effective digital pedagogical practices (Vilkova & Shcheglova, 2021). In this context, students, especially younger learners, need to develop skills to manage and regulate their own learning processes, while continuously improved digital platforms are essential for sustaining education during disruptions. Since MOOCs serve diverse global learners, they should incorporate features that support SRL and enhance engagement (Wong et al., 2019). However, many MOOCs still lack strategies that promote active participation and learner control (Onah et al., 2024). Therefore, integrating design approaches that foster SRL remains crucial for improving learning outcomes in these environments (Onah et al., 2021).

## Self-Regulated Learning (SRL) and MOOCs

SRL refers to an individual's active involvement in the learning process through setting learning goals and directing their own learning activities (Wong et al., 2019). Individuals with strong SRL skills can plan their learning, use appropriate strategies, and evaluate their progress throughout the learning process. When they realize that their progress is insufficient, they can adopt new strategies and techniques to improve their learning outcomes (Williams & Hellman, 2004). The literature defines SRL from different perspectives. Pintrich (2000) defines SRL as an active, constructive process in which learners set learning goals and monitor, regulate, and control their cognition, motivation, and behavior to achieve them. In general, SRL can be understood as the way individuals manage and organize their learning processes, monitor and evaluate their progress, and plan learning actions and behaviors that increase the likelihood of achieving their goals (Zimmerman et al., 2015).

Various models have been proposed to explain SRL (Alonso-Mencia et al., 2020). Zimmerman (1990) approached SRL from a socio-cognitive perspective, while Boekaerts and Niemivirta (2000) emphasized emotions. Similarly, Winne and Hadwin (1998) and Pintrich (2000) highlighted the importance of motivation. Despite these differences, all models conceptualize SRL as a cyclical process consisting of three phases: preparation, performance, and appraisal, corresponding to before, during, and after a learning task (Jansen et al., 2020; Reparaz et al., 2020).

The preparation phase involves processes and motivational factors that shape learners' willingness to regulate their learning (Zimmerman & Moylan, 2009). In this phase, learners analyze tasks, evaluate their abilities, set goals, and plan strategies to achieve them, emphasizing goal setting and strategic planning (Alonso-Mencia et al., 2020; Alvarez et al., 2022; Jansen et al., 2020; Reparaz et al., 2020). During the performance phase, learners carry out tasks while monitoring their progress and maintaining focus through self-control and self-observation (Alonso-Mencia et al., 2020; Zimmerman & Moylan, 2009). This phase includes cognitive, metacognitive, and resource-management strategies, such as task strategies, help-seeking, time management, and structuring the environment (Tang & Bao, 2024). The appraisal phase involves evaluating outcomes after task completion, with results informing the next preparation phase as learners adjust their strategies to improve performance and focus on self-evaluation and self-satisfaction (Alonso-Mencia et al., 2020; Tang & Bao, 2024).

Barnard et al. (2009) conceptualize SRL as a multidimensional construct consisting of six components: goal setting, time management, help-seeking, task strategies, environment structuring, and self-evaluation. These components are widely recognized as key SRL strategies in MOOC environments. However, Vilkova and Shcheglova (2021) note that although many studies emphasize the importance of different SRL dimensions in MOOCs, not all components can be fully implemented in MOOC settings. In this study, we used the components proposed by Barnard et al. (2009) to evaluate middle school students' SRL skills.

Goal setting refers to determining specific learning or performance outcomes and identifying strategies to achieve them (Alonso-Mencia et al., 2020; Tang & Bao, 2024). In SRL, goals can be non-specific (e.g., earning a certificate) or specific, focusing on developing meaningful knowledge and skills (Littlejohn et al., 2016; Milligan & Littlejohn, 2016). Task strategies involve selecting and adapting learning approaches during the performance phase, such as note-taking or using additional resources (Alonso-Mencia et al., 2020; Littlejohn et al., 2016). Help-seeking is a social component of SRL that involves obtaining support from peers, instructors, or other sources (Alonso-Mencia et al., 2020). Time management refers to organizing study time to achieve learning goals effectively, while environment structuring involves arranging learning settings to enhance focus and reduce distractions (Onah et al., 2021). Finally, self-evaluation refers to monitoring and assessing one's learning progress and outcomes against set goals (Zalli et al., 2019; Alonso-Mencia et al., 2020).

In traditional learning environments, teachers typically manage responsibilities such as setting objectives, monitoring progress, and evaluating learning. In MOOCs, however, these responsibilities largely shift to learners (Albelbisi & Yusop, 2019; Wong et al., 2019; Zhao et al., 2024). Therefore, SRL is crucial in MOOC environments, where learners have greater control, limited teacher guidance, and flexibility in shaping their learning paths (Jansen et al., 2022; Alonso-Mencia et al., 2021; Vilkova, 2022). Consequently, many MOOCs are designed to help learners regulate and manage their own learning processes with minimal reliance on instructors (Albelbisi, 2019; Jansen et al., 2022).

Previous research shows that SRL in MOOCs enhances student engagement (Albelbisi, 2019; Alonso-Mencia et al., 2021; Wei et al., 2023). Studies on SRL in MOOCs have mainly involved MOOC users, university students, teachers, and high school students, often using platforms such as Coursera, edX, and OpenLearning (Dinh & Phuong, 2024; Onah et al., 2024). Research has examined SRL in relation to variables such as motivation, engagement, completion, satisfaction, self-efficacy, and performance (Wei et al., 2023; Zalli et al., 2019). Although some studies have redesigned MOOCs to support better SRL, research combining SRL and engagement remains limited, with most studies focusing on their effects on success and course completion (Albelbisi & Yusop, 2019; Ceron et al., 2024).

## Engagement and MOOCs

Engagement, defined as active involvement in educational activities, refers to learners' persistence in the learning process despite challenges and their willingness to continue learning with enthusiasm (McClenney, 2007). In the context of MOOCs, engagement refers to the extent to which students become emotionally and cognitively involved in their courses and the behavioral effort they invest in mastering the content and achieving success (Wang et al., 2022). Researchers generally examine engagement through several dimensions, including behavioral, cognitive, emotional, and social engagement (Deng et al., 2020a).

Behavioral engagement refers to observable and measurable learning behaviors (Shen et al., 2024; Shin & Song, 2022). These include completing homework, studying regularly, participating in structured learning activities, and demonstrating effort during the learning process (Eryilmaz, 2014; Xiaohua & Ibrahim, 2023). In online learning environments, it also involves active participation such as posting, commenting, responding to discussions, and voting (Liu et al., 2024; Wang et al., 2022). In MOOCs, behavioral engagement includes participating in tests, completing assignments, and engaging in platform-based activities (Daniels et al., 2016; Deng et al., 2020a, 2020b). Additionally, taking notes and reviewing them for assessments are also considered indicators of behavioral engagement (Deng, 2024; Shen et al., 2024).

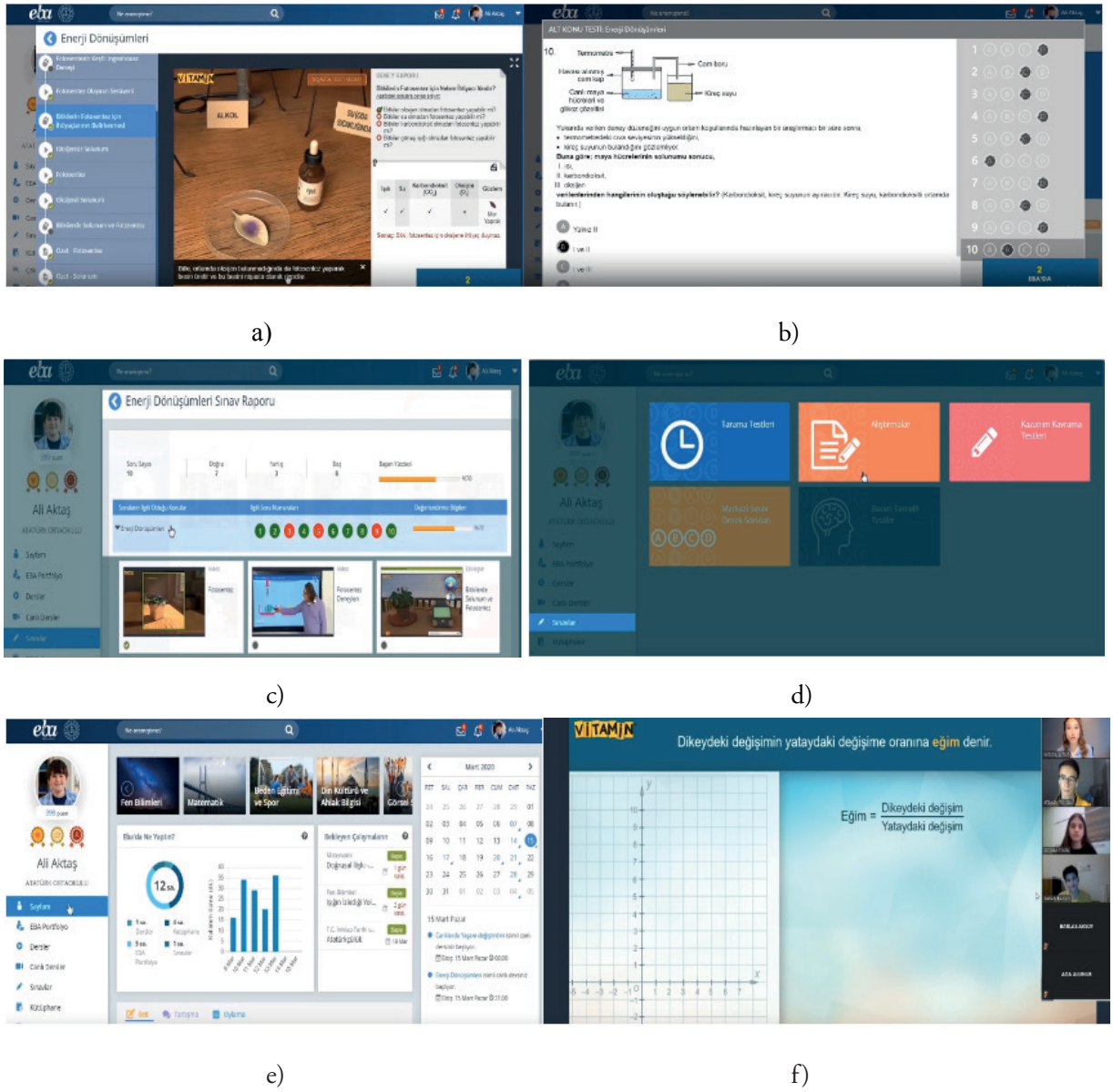
Cognitive engagement refers to an individual's ability to connect prior knowledge with newly acquired knowledge in line with learning goals (Eryilmaz, 2014). It involves mental investment in the learning process, including focus and concentration (Oz, 2019). This dimension involves psychological processes such as understanding complex information, applying self-regulation strategies, and mastering challenging skills (Xiaohua & Ibrahim, 2023). It reflects learners' willingness to invest effort in comprehending difficult concepts and improving performance (Deng, 2024).

Affective engagement refers to learners' emotional responses toward the course, peers, and instructors (Shin & Song, 2022). It involves participating in learning activities with positive emotions, such as enthusiasm, curiosity, and enjoyment, while experiencing fewer negative emotions, such as stress or anxiety. This dimension includes emotional reactions to academic content and the learning environment, such as interest, excitement, frustration, or boredom (Deng et al., 2020b). Social engagement refers to students' interactions with peers and instructors within the online learning environment (Deng et al., 2020a). It involves participation in the learning community, building connections, and communicating throughout the learning process. In MOOC environments, key examples include sharing information via messages and discussion forums, as well as commenting on others' posts (Daniels et al., 2016).

Studies on engagement in MOOCs have generally been conducted with individuals between the ages of 15 and 65 using MOOC platforms such as Coursera, edX, and iCourse163 (Anghel et al., 2023; Cobos & Ruiz-Garcia, 2021; Deng et al., 2020b; Deng, 2024; Galikyan et al., 2021; Liu et al., 2022a; Liu et al., 2024; Sun et al., 2019; Yang & Li, 2024). Previous research has examined engagement in MOOCs from different perspectives, including engagement patterns, gamification, motivation, and its relationship with self-determination theory (Anghel et al., 2023; Deng et al., 2020b; Liu et al., 2022a; Liu et al., 2024; Wei et al., 2024; Sun et al., 2019). In addition, studies have explored the relationship between engagement and variables such as course completion, perceived control, intrinsic and extrinsic value, achievement emotions, video styles, achievement, basic psychological needs, task–technology fit, academic hardiness, attitude, and satisfaction (Deng, 2024; Liu et al., 2023; Liu et al., 2024; Wei et al., 2024; Yang & Li, 2024).

## Educational Informatics Network (EIN)

Several countries have developed widely accessible MOOC platforms such as edX, Coursera, Khan Academy, and Udemy to support global learning. In addition, national platforms have emerged, including Edraak (Egypt), SWAYAM (India), XuetangX (China), Veduca (Brazil), and OpenEdu (Russia) (Khalaf, 2022). In Turkiye, the Education Informatics Network (EIN) functions as a national platform supported by the Ministry of National Education, offering digital learning opportunities for K–12 students. According to YEGITEK (2021), EIN has been used by approximately 14 million students and 1 million teachers, with around 300 million live lessons conducted.




a) b)

c) d)

e) f)

**Figure 1.** (a) Sample lecture video on EBA, (b) Test section, (c) feedback based on test results, (d) activity and practice section, (e) portfolio section, (f) live lessons

In the EIN platform, course content is organized into units. Students learn the topics through videos and animations prepared for each unit. After studying the content, they can assess their understanding through tests available in the system and receive feedback on their performance. Teachers can also award badges to students based on their achievements on the platform. In addition, teachers can share supplementary resources and presentations related to the lessons and schedule live sessions where lectures, tests, and exercise

solutions are provided. Students can access these materials repeatedly by logging into the system at any time and from any location. The EIN platform also includes a portfolio section where students can view information such as their academic achievements over the years, teachers' feedback, participation rates in activities, and the badges and emblems they have earned. This feature allows students to monitor and evaluate their own learning progress. Furthermore, EIN provides communication tools such as discussion forums, messaging, and voting areas, enabling students to interact with their peers and teachers.

## RATIONALE AND IMPORTANCE

According to Rothkrantz et al. (2024), middle school learning materials may sometimes be insufficient for achieving intended outcomes, and addressing individual needs in classrooms can be time-consuming. Therefore, motivating, engaging, and cost-effective solutions such as MOOCs are proposed. MOOCs are considered important innovations for improving education and transforming secondary education systems (Warren et al., 2023), especially in contexts where schools lack sufficient resources (Loh et al., 2024).

SRL and engagement, as key factors in MOOC success, can enhance effectiveness and reduce failure rates (Albelbisi & Yusop, 2019; Li et al., 2024; Zakaria et al., 2024). Researchers emphasize developing interventions that support SRL and engagement (Alonso-Mencia et al., 2021; Ceron et al., 2024; Zakaria et al., 2024). Instructional design plays a critical role in supporting SRL and reducing dropout (Reparaz et al., 2020), while analyzing engagement can help improve course design and learner outcomes (Huang et al., 2023; Sun et al., 2019). Poorly designed content and activities can limit student participation, making active engagement a key challenge in MOOCs (Liu et al., 2023).

In this context, examining students' experiences on the EIN platform regarding SRL and engagement, as well as differences associated with EIN use, can provide insights into improving platform design. Supporting SRL and increasing engagement can help students manage learning more effectively and achieve academic goals (Dinh & Phuong, 2024).

Although most MOOC studies focus on learners aged 15 and older, research at the middle school level remains limited (Anghel et al., 2023; Cobos & Ruiz-Garcia, 2021; Deng, 2024; Yang & Li, 2024). Addressing this gap, this study investigates middle school students' SRL and engagement in EIN and examines whether EIN use is associated with differences in these variables. To address these aims, the following research questions are explored;

a. Is there a significant difference between middle school students' SRL scores before and after using the EIN?
b. Is there a significant difference in engagement scores of middle school students before and after using EIN?
c. What are middle school students' opinions regarding SRL experiences in EIN?
d. What are middle school students' opinions regarding engagement experiences in EIN?
e. How are themes connected to middle school students' engagement and SRL experiences related?

## METHOD

This study employed an intervention design using a mixed-methods research approach. In this method, researchers implement the intervention in a sample, use quantitative data to evaluate its effects, and use qualitative data to understand better and improve the intervention process (Gallo & Lee, 2015). Qualitative data are particularly valuable in intervention studies because they help researchers better understand the context and conditions surrounding the intervention, the contextual factors and causal mechanisms that produce its effects, how these mechanisms operate, and why different participants may experience different outcomes (Fabregues et al., 2022). By combining qualitative data with a quantitative evaluation design, researchers can obtain detailed contextual and individual-level information about why, how, and under what conditions an intervention is effective or ineffective.

## Population and Sample

The study population consists of middle school students. The sample includes 60 students from the 5th, 6th, 7th, and 8th grades of a middle school in Rize, Turkiye. Among the participants, 34 are female, and 26 are male. Fourteen students are in the 5th grade, fifteen in the 6th grade, twelve in the 7th grade, and nineteen in the 8th grade. The researchers selected participants using purposive sampling. In purposive sampling, researchers select participants who can provide the most relevant information for the study, based on the research purpose and their prior knowledge (Fraenkel & Wallen, 2009). During selection, students needed to use the EIN platform actively, and each student needed access to at least one device at home, such as a tablet, desktop computer, or laptop. For the qualitative part of the study, 20 students from 5th, 6th, 7th, and 8th grades volunteered. We selected five students from each grade level. Among these students, 12 were female, and 8 were male.

## Data Collection Tools

### MOOC Engagement Scale

The MOOC Engagement Scale, developed by Deng et al. (2020a) and adapted into Turkish by Bicer and Reisoglu (2022), consists of four dimensions. In the Turkish adaptation, the behavioral, cognitive, and social engagement dimensions each include three items. In contrast, the affective engagement dimension consists of two items, for a total of eleven items. The scale is a 6-point Likert-type instrument. The Cronbach's alpha reliability coefficient for the overall scale is .89. The reliability coefficients for the subdimensions are .80 for behavioral engagement, .75 for cognitive engagement, .75 for affective engagement, and .80 for social engagement. The fit indices obtained from the confirmatory factor analysis (CFA) are as follows: $\chi^2$ = 100.29, df = 38, $p < .001$, GFI = 0.96, AGFI = 0.94, RMSEA = 0.06, SRMR = 0.03, NFI = 0.96, NNFI = 0.96, and CFI = 0.97.

### Self-Regulated Learning Scale

The Perceived Self-Regulation Scale, developed by Arslan and Gelisli (2015), is a 5-point Likert-type instrument. The scale consists of two dimensions and 16 items. The first eight items belong to the "openness" dimension, which relates to individual learning and personal effort. The remaining eight items belong to the "seeking" dimension, which focuses on developing and using different learning strategies.

The Cronbach's alpha reliability coefficient for the overall scale was calculated as .90. The reliability coefficients for the subdimensions were .80 for openness and .85 for seeking. The fit indices obtained from the confirmatory factor analysis (CFA) are as follows: RMSEA = .042, NFI = .98, CFI = .99, IFI = .99, RFI = .97, GFI = .94, AGFI = .92, and SRMR = .035.

### Interview Form

This study used semi-structured interviews to examine middle school students' experiences with the EIN platform regarding SRL and engagement. Semi-structured interview forms help researchers conduct systematic, comprehensive interviews with larger, more diverse groups by defining the topics to be addressed in advance (Patton, 2014). In this context, the researcher prepared a semi-structured interview guide consisting of eight questions aligned with the research questions. One language expert and two domain experts reviewed the interview questions, and the interview form was finalized based on their feedback. We conducted audio-recorded interviews, each lasting up to 30 minutes, with 20 voluntary student participants with their permission. Examples of items included in the interview form: *"How did you benefit from EIN's features when you had difficulty understanding the topics? How did the features offered by the EIN affect your ability to monitor your own development? How did you plan your time to learn English at EIN?"*

## Implementation Process

Ethical approval (No. 2021/68) was obtained from the Social and Human Sciences Ethics Committee of Recep Tayyip Erdogan University on 23.03.2021. The researchers obtained the necessary permissions from the Ministry of National Education and parental consent. All participants were informed and participated voluntarily.

The implementation began with administering pre-tests via Google Forms and informing students about the process through online meetings in the English course. The study then conducted an 8-week intervention aligned with the curriculum. Students studied upcoming units in advance through lecture videos and vocabulary activities shared on the EIN platform. Each week, the teacher uploaded vocabulary materials and guided students to study regularly, watch videos, and complete related exercises, with the system providing immediate feedback. The teacher held weekly live sessions and monitored student participation (e.g., video viewing, activities, forum engagement). At the end of the process, we administered post-tests and conducted interviews with 20 students.

## Data Analysis

Quantitative data analysis focused on comparing pre-test and post-test scores. Skewness and kurtosis values for both scales were within the –2 to +2 range, and histograms, stem-and-leaf plots, Q–Q plots, and z-scores indicated a normal distribution. According to George and Mallery (2010), values within this range suggest normality, while z-scores beyond ±1.96 may violate this assumption. Since the data were normally distributed, a dependent-samples t-test was conducted. Results were further interpreted using effect sizes, which reflect the magnitude of the differences. Based on Cohen (1988), r values up to 0.20 indicate small effects, up to 0.50 medium effects, and above 0.50 large effects.

Deductive analysis was used to analyze the qualitative data. In this type of analysis, researchers examine whether the theory they define or develop is consistent with the study's hypotheses or assumptions (Thomas, 2006). Researchers also determine whether sufficient data exist within the identified themes based on the theoretical framework (Creswell, 2013). In this study, Table 1, developed from the literature, served as the analytical framework. First, the interviews were transcribed. The researchers then read the transcripts several times. Afterward, the researchers created themes and codes by considering the categories presented in Table 1. Three months later, the researchers re-examined the categories and codes they had developed. The researchers calculated the inter-coder reliability coefficient as 0.86 (McHugh, 2012). The researchers analyzed the qualitative data using MAXQDA Analytics Pro.

**Table 1.** SRL and engagement indicators

| SRL Sub Factors | Indicators | References |
|---|---|---|
| Goal Setting | • Setting learning goals.<br>• Defining non-specific learning goals.<br>• Defining specific learning goals. | Alonso-Mencia et al., 2020; Alvarez et al., 2018; Barnard et al. 2009; Ceron et al., 2024; Littlejohn et al., 2016; Milligan & Littlejohn, 2016; Onah et al., 2021 |
| Time Management | • Planning and managing study time to achieve goals and complete desired tasks.<br>• Planning weekly activities.<br>• Regularly log into the system and engage with the content.<br>• Establishing a weekly routine. | Alonso-Mencia et al., 2020; Alvarez et al., 2018; Barnard et al. 2009; Martinez-Lopez et al., 2017; Onah et al., 2021; |
| Task Strategies | • Taking notes.<br>• Completing lectures.<br>• Exploring the topic through external materials.<br>• Highlighting important points in learning materials.<br>• Setting a study agenda before engaging with the learning materials. | Alonso-Mencia et al., 2020; Alvarez et al., 2022; Alvarez et al., 2018; Barnard et al. 2009; Littlejohn et al., 2016; Martinez-Lopez et al., 2017; Milligan & Littlejohn, 2016; |

| | | |
|---|---|---|
| Help-Seeking | • Asking for help from teachers and friends through the forum.<br>• Seeking external help to understand certain content. | Alonso-Mencia et al., 2020; Alvarez et al., 2018; Barnard et al. 2009; Milligan & Littlejohn, 2016 |
| Environment Structuring | • Restructuring the study environment to facilitate learning and avoid distractions.<br>• Finding a comfortable place to study. | Alonso-Mencia et al., 2020; Barnard et al. 2009; Martinez-Lopez et al., 2017; Onah et al., 2021 |
| Self-Evaluation | • Judging one's performance and outcomes according to established learning goals.<br>• Evaluating the quality of learning outcomes and the learning process.<br>• Comparing performance with previous students who completed the course or with classmates. | Alonso-Mencia et al., 2020; Alvarez et al., 2022; Alvarez et al., 2018; Barnard et al. 2009; Martinez-Lopez et al., 2017; Onah et al., 2021; |
| Engagement Sub Factors | Indicators | References |
| Behavioral Engagement | • Posting, commenting, responding, and voting during learning.<br>• Participating in tests, assignments, and activities.<br>• Taking notes while studying.<br>• Reviewing notes when preparing for assessments. | Daniels et al., 2016; Deng et al., 2019; Deng et al., 2020b; Deng, 2024; Liu et al., 2024; Wang et al., 2022; Shen et al., 2024 |
| Cognitive Engagement | • Watching videos.<br>• Applying knowledge to tests and exercises.<br>• Willingness to exert mental effort to learning and performance. | Daniels et al., 2016; Deng, 2024 |
| Social Engagement | • Sharing information with friends and teachers through messaging and discussion forums.<br>• Commenting on the posts made by friends. | Daniels et al., 2016; Deng et al., 2020 |
| Emotional Engagement | • Emotional expressions in discussion forums.<br>• Emotional response to the course, friends, and teachers.<br>• Feeling pleasure and excitement while watching course videos and participating in activities or forums | Daniels et al., 2016; Deng, 2024; Shin & Song, 2022 |

## FINDINGS

### The Difference between Middle School Students' SRL Scores

Table 2 presents the results of the dependent-samples t-test comparing the pre-test and post-test scores of middle school students' SRL levels on the EIN platform.

**Table 2.** Dependent t-test results of the middle school students' self-regulated learning pre-test and post-test scores

| Measurement | N | $\bar{X}$ | S | df | t | p | r |
|---|---|---|---|---|---|---|---|
| Openness Pre-Test | 60 | 28.66 | 4.88 | 59 | -7.96 | .00 | .71 |
| Openness Post-Test | 60 | 31.50 | 4.84 | | | | |
| Seeking Pre-Test | 60 | 28.13 | 4.76 | 59 | -9.09 | .00 | .76 |
| Seeking Post-Test | 60 | 31.91 | 4.79 | | | | |
| Self-Regulated Learning Pre-Test | 60 | 56.79 | 9.24 | 59 | -9.20 | .00 | .77 |
| Self-Regulated Learning Post-Test | 60 | 63.41 | 9.27 | | | | |

As shown in Table 2, significant differences were found between the pre-test and post-test scores of the middle school students in terms of overall SRL scores and the openness and seeking dimensions. These differences favor the post-test scores and indicate a large effect size.

## The Middle School Students' Opinions regarding SRL Experiences on EIN

Figure 2 presents the themes and codes for the middle school students' SRL experiences.

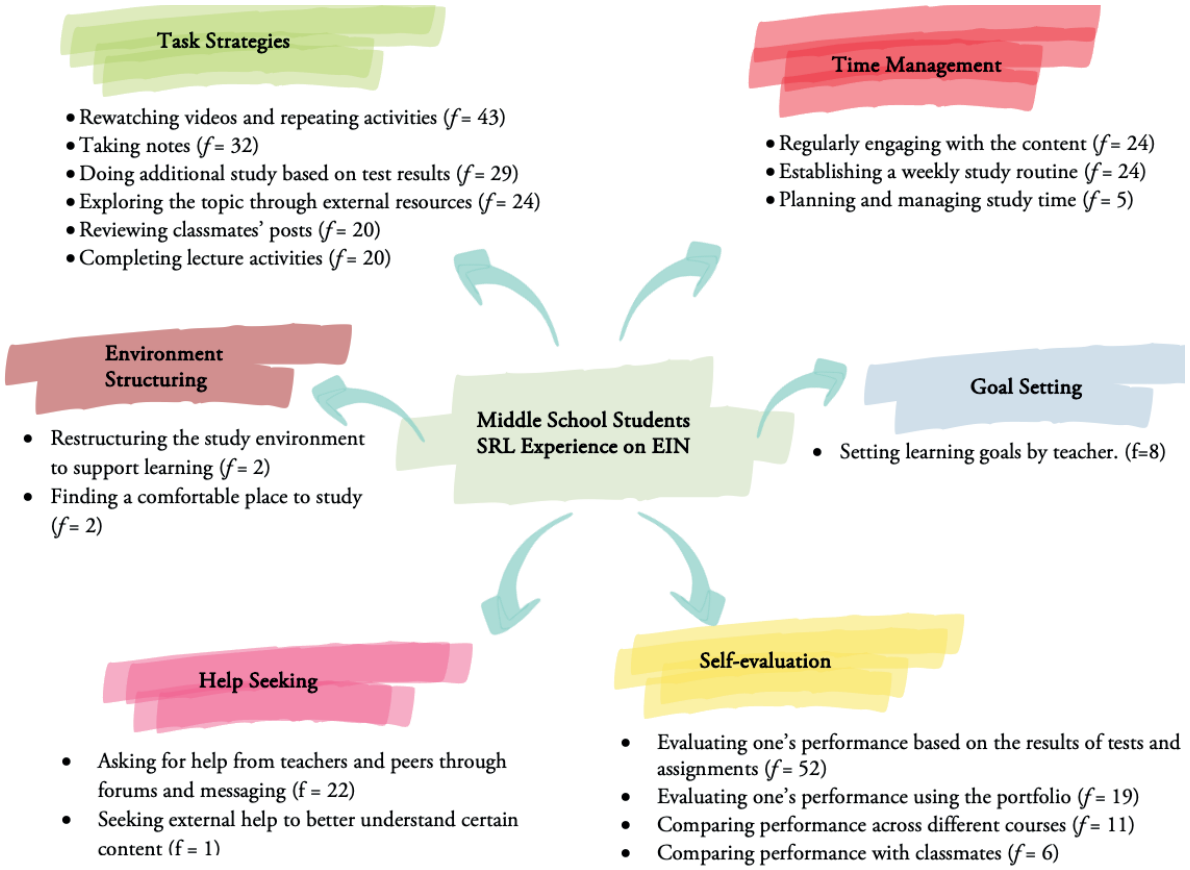



**Figure 2.** The middle school students' SRL experiences in EIN.

Figure 2 shows that teachers set weekly goals and objectives within the *"Goal setting"* theme on the EIN platform. However, students did not set their own goals and objectives through the EIN system. Direct quotations related to this issue are presented below:

> *"For example, if the goal of the week was to log in to EIN, watch the videos, and study the vocabulary, I watched the related video." (S11, Female, 5th grade)*
>
> *"I watched the videos regularly in order to reach the goals set by my teacher."* (S12, Female, 7th grade)

When examining the *"Time Management"* theme, students regularly log into the EIN platform to study and complete the weekly tasks and activities assigned by the teacher. However, the students did not create their own weekly tasks or activities. Some students incorporated EIN study into their personal study schedules. Direct quotations illustrating this situation are presented below:

> *"I log in to EIN every day for all my classes. I spent the required time on that week's activities. Some tests are short, while others are longer depending on the number of questions. I spent time regularly each week, but the amount of time I spent varied from week to week."* (S7, Female, 8th grade)

Regarding the *"Task Strategies"* theme, students mostly reported rewatching the videos, repeating the activities, and taking notes while watching. When the videos and activities were insufficient, they sought additional resources and reviewed their classmates' discussion forum posts to understand the topic better. When their test results were low, students tended to rewatch the EIN videos and repeat the activities, use

different resources to address learning gaps, and review information and materials shared by classmates in the discussion forums. In addition, all students completed the tasks and activities assigned by the teacher via EIN to achieve higher test scores. Direct quotations related to this theme are presented below:

> *"If everything was correct in my test results, I did nothing; but if there were mistakes, I checked the solutions. When I did not understand something, I looked at my notes, and sometimes I did additional research."* (S5, Female, 7th grade)
>
> *"First, I checked the mistakes in my test results. Then I studied the topic again—sometimes on EIN and sometimes using other sources. I also did some research."* (S2, Female, 7th grade)

Regarding the *"Help-Seeking"* theme, students mostly asked their teachers and friends for help and rarely sought assistance from others. Direct quotations related to this theme are as follows:

> *"Asking my teacher or a friend about something I did not understand also helped."* (S13, Male, 6th grade)

Students provided little information on the *"Environment Structuring"* theme. Only a few students mentioned trying to arrange a suitable environment for studying. Direct quotations related to this theme are as follows:

> *"I can take a break from the activity and come back later. I can return whenever I want. It does not matter whether I am in the garden or at home."* (S6, Female, 8th grade)

Regarding the *"Self-evaluation"* theme, students generally evaluated whether they had met the course or weekly objectives based on activity and test results. Through the portfolio section of EIN, students could view the videos they watched for different courses, their test results, the feedback they received from their teachers, and the badges they earned. These features helped them track their progress and evaluate how well they met their learning goals. In addition, students could view their performance in the same course compared with previous years through EIN and compare their success with that of their classmates. This also helped them assess their own performance. Direct quotations related to this theme are presented below:

> *"I can see my development from previous years in the portfolio section. It shows which activities I have completed and which I have not. My teachers' comments are there, and I can follow them. I can see my development from lesson to lesson. EIN gives points when I complete these activities. I can see my ranking in the class, and the school ranking is also visible. There is a ranking section, and badges can be earned as well."* (S14, Male, 8th grade)

## The Difference between Middle School Students' Engagement Scores

Table 3 presents the results of the t-test comparing middle school students' engagement levels in the EIN based on their pre-test and post-test scores.

**Table 3.** Dependent t-test results of the middle school students' engagement pre-test and post-test scores

| Measurement | N | $\bar{X}$ | S | df | t | p | r |
|---|---|---|---|---|---|---|---|
| Behavioral Engagement Pre-Test | 60 | 11.18 | 3.50 | 59 | -7.61 | .00 | .70 |
| Behavioral Engagement Post-Test | 60 | 14.41 | 2.49 | | | | |
| Cognitive Engagement Pre-Test | 60 | 13.48 | 2.93 | 59 | -5.25 | .00 | .56 |
| Cognitive Engagement Posttest | 60 | 14.83 | 2.40 | | | | |
| Affective Engagement Pre-Test | 60 | 8.93 | 2.16 | 59 | -4.88 | .00 | .53 |
| Affective Engagement Post-Test | 60 | 10.20 | 1.60 | | | | |
| Social Engagement Pre-Test | 60 | 9.03 | 3.79 | 59 | -4.28 | .00 | .48 |
| Social Engagement Post-Test | 60 | 11.15 | 4.42 | | | | |
| Engagement Pre-Test | 60 | 42.63 | 9.73 | 59 | -8.94 | .00 | .78 |
| Engagement Post-Test | 60 | 50.60 | 8.11 | | | | |

As shown in Table 3, significant differences were found between the pre-test and post-test scores of middle school students on the overall engagement scale and the behavioral, cognitive, affective, and social engagement dimensions. The results favored the post-test scores and indicated a large effect size, while the effect size for the social engagement dimension was moderate.

## The Middle School Students' Opinions regarding Engagement Experiences in EIN

Figure 3 presents the themes and codes for the engagement of middle school students on the EIN platform.

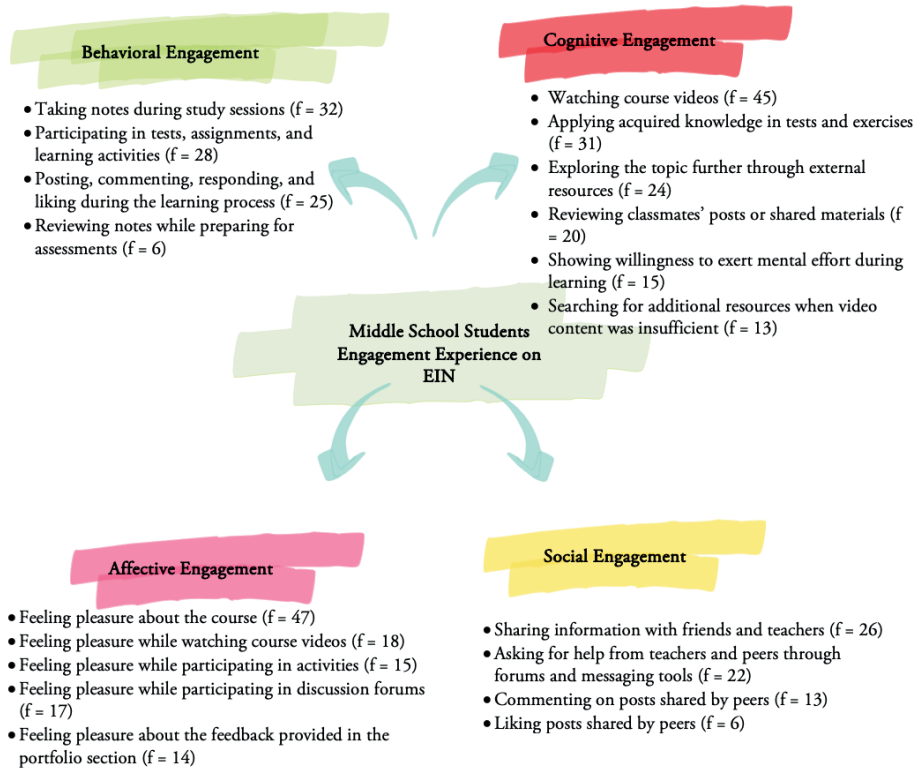



**Figure 3.** The middle school students' engagement experiences in EIN.

Regarding the *"Behavioral Engagement"* theme, students reported taking notes while watching the videos, participating in tests and activities on the EIN platform, sharing posts, commenting on and liking posts on the discussion forums, and reviewing their notes before completing the tests. Direct quotations related to this theme are presented below:

> *"I reviewed the mistakes I made in the questions I solved and asked my teacher when I did not understand something. I also looked at my notes again to identify my deficiencies." (S3, Female, 6th grade)*
>
> *"In the exams section, the achievement tests were divided into sections called skill-based tests. This allowed me to complete tests in the specific area I wanted easily." (S12, Female, 7th grade)*

Regarding the *"Cognitive Engagement"* theme, students reported watching the EIN videos and completing tests and activities using the knowledge they had acquired. They stated that they carefully reviewed the videos, completed the activities attentively, and made efforts to understand the subject as thoroughly as possible. When the videos and activities were insufficient, students sought additional resources and reviewed their classmates' posts. Some students also noted that they searched for external resources because the course videos did not provide enough information to fully understand the topic. Representative quotations related to this theme are presented below:

> *"While some videos were useful, I tried to better understand the topic by watching additional videos from other sources. The number of videos on EIN could be increased, and more detailed explanations could be provided."* (S17, Female, 5th grade)
>
> *"To better understand the subject, I searched for other activities on EIN, solved more questions, and tried to understand the topic by watching the video again."* (S8, Male, 5th grade)

Regarding the theme of *"Affective Engagement",* students reported feeling satisfied with the course content, exchanging ideas with their peers in the discussion forums, participating in activities, and receiving feedback and badges in the portfolio section. Representative quotations related to this theme are presented below;

> *"EIN also gives badges for discussion and sharing, which is motivating."* (S12, Female, 7th grade)
>
> *"It is an enjoyable environment because all my friends are there. When they joined, I felt more motivated and ambitious."* (S3, Female, 6th grade)
>
> *"The video-watching feature in EIN helped me learn on my own because the videos are very educational and clear."* (S7, Female, 8th grade)

Regarding the *"Social Engagement"* theme, students reported sharing their knowledge and experiences with peers and teachers in discussion forums, responding to peers' questions, commenting on posts, and liking classmates' contributions. They also indicated that they sought help from teachers and peers through discussion forums and messaging tools when they had difficulty understanding certain topics. Representative quotations related to this theme are presented below:

> *"I write to my teachers and friends through EIN, and they write back to me. I made progress by receiving feedback from them. This helped me understand the subject better. I also shared interesting things on my page, and my friends wrote comments on them. I was very happy when they commented. I also commented on their posts, and sometimes it felt like a chat environment in the classroom."* (S3, Female, 6th grade)
>
> *"I shared some posts, and they were good. My friends also shared very nice posts, and I thanked them and clicked the like button."* (S5, Female, 7th grade)

### Relationship between Themes Related to Middle School Students' Engagement and SRL Experiences

Figure 4 reflects the relationship between middle school students' SRL and engagement experiences codes on EIN.

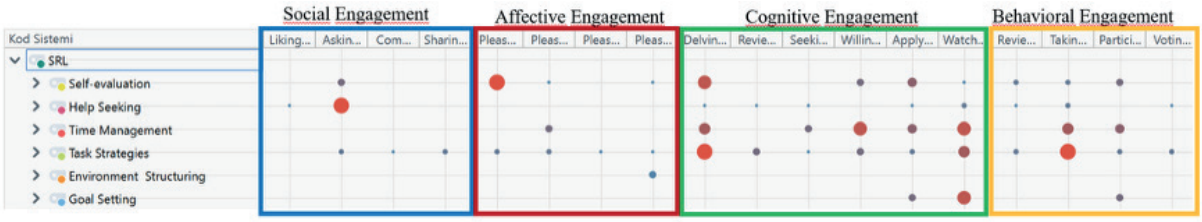



**Figure 4.** The relationship between EIN' SRL and engagement experiences of middle school students.

When Figure 4 is examined, it becomes clear that middle school students' SRL and engagement experiences are closely related. SRL appears to be particularly associated with behavioral and cognitive engagement codes. It is also evident that self-evaluation and task strategies are related to all sub-dimension codes of engagement. Help-seeking is associated with social, behavioral, and cognitive engagement sub-dimensions, while time management is related to behavioral, cognitive, and affective engagement.

## DISCUSSIONS AND CONCLUSION

### Middle School Students' SRL Score Differences and Experiences in EIN

The study found that middle school students' SRL scores increased after using the EIN platform. Although the scale did not include time management and environmental structuring, the results suggest that EIN supports task strategies, help-seeking, and self-evaluation. Students also reported frequently using strategies such as task planning, time management, help-seeking, and self-evaluation during the process. Similarly, Onah et al. (2024) identified goal setting, time management, environment structuring, and self-evaluation as commonly used strategies in MOOCs. However, some studies report no change in SRL (Vilkova, 2022), which may be due to differences in content structure and design complexity (Dinh & Phuong, 2024). In this context, EIN appears to provide a design that facilitates more effective use of SRL strategies among middle school students.

The study found that students did not set their own goals in EIN; instead, the teacher provided weekly goals, tasks, and videos. This structure has supported timely task completion and active platform use. The lack of student-generated goals may relate to the MOOC design, as predetermined goals can reduce the need for learners to set their own (Littlejohn et al., 2018). Research shows that learner-directed environments better support goal setting. For example, students in the ElDa platform could create their own learning paths (Onah et al., 2024), and tools like Autorregulate enabled learners to develop goal-setting strategies by designing their own study plans (Ceron et al., 2024). *Goal setting* is also critical within the SRL cycle, influencing monitoring, reflection, and future planning (Wong et al., 2021). Therefore, future implementations of EIN could offer both instructor-led and learner-directed modes. In learner-directed settings, students can be supported in defining their own goals and learning paths using tools such as Autorregulate.

The study found that, in terms of *"Time Management",* students regularly logged into EIN, watched course videos, and completed weekly tasks. Supporting this, Perez-Sanagustin et al. (2020) showed that weekly planning reports, where students evaluate goals and time use, improve time management and planning. Similarly, tools like Autorregulate enable learners to plan study time and have been found to enhance time management significantly (Ceron et al., 2024). Other systems using visual and adaptive supports also contribute to better time use (Khiat, 2022), and time management interventions in MOOCs can improve learning outcomes (Alonso-Mencia et al., 2020). Based on these findings, EIN could be enhanced with

features that allow students to set weekly goals, plan their study time, and track the time they actually spend. Learning analytics or adaptive systems could provide feedback and suggestions to further improve time management.

Regarding *"Task Strategies",* students using EIN frequently watched videos, took notes, revisited content after low test scores, used additional resources, and reviewed peers' posts. These strategies are consistent with the literature (Alonso-Mencia et al., 2020; Alvarez et al., 2022). However, students did not use strategies such as highlighting key points or creating structured study plans, possibly because EIN did not offer these features. Similarly, some studies report limited use or development of task strategies in MOOC environments (Onah et al., 2024; Dinh & Phuong, 2024), suggesting that these strategies require guidance and practice. In this context, integrating an adaptive, learning analytics–based system into EIN could help monitor student behaviors and provide personalized strategy recommendations, supporting more effective use of task strategies.

Regarding *"Help-seeking",* many students sought support from teachers and peers through discussion forums and messaging tools, which are widely recognized as key features of MOOC platforms (Alonso-Mencia et al., 2020; Milligan & Littlejohn, 2016). However, some studies report limited improvements in help-seeking despite technological support or training (Ceron et al., 2024; Li et al., 2022; Dinh & Phuong, 2024), and help-seeking is used less frequently than other SRL strategies (Onah et al., 2024). In this study, the fully online, 8-week, structured implementation encouraged more frequent interaction via EIN. Based on these findings, EIN could be enhanced by tools that organize and rank forum content by user queries to provide more relevant responses. Additionally, instructors can promote effective help-seeking by assigning tasks that require active participation in discussion forums.

Regarding the *"Environment Structuring"* theme, only a few students reported having tried to arrange a quiet, calm place to study. However, the EIN platform includes no tool or feature specifically designed to support this strategy. In the literature, researchers have mostly identified the environment-structuring strategy in MOOCs through data collected from users via scale items (Onah et al., 2024; Vilkova & Shcheglova, 2021). These studies indicate that users seek a comfortable, appropriate place to study to maintain concentration. Based on these findings, EIN could include reminder messages encouraging students to create a quiet, suitable study environment before starting their learning activities.

Regarding *"Self-evaluation",* students assessed their performance through test results and the portfolio section, which allowed them to track progress over time and compare their performance with peers. However, because they did not set goals or create study plans, they could not evaluate their goals or the overall efficiency of their learning process. Previous research indicates that tests and assignments function as checkpoints for self-evaluation and feedback (Alonso-Mencia et al., 2020), while some MOOC systems support evaluation through expert-based rubrics and visual performance data such as graphs (Perez-Alvarez et al., 2018). Structured diaries have also been shown to enhance self-evaluation (Mou, 2023). In this context, while the EIN portfolio supports performance monitoring, integrating structured diaries could further help students evaluate their goals and learning processes.

## Middle School Students' Engagement Score Differences and Experiences in EIN

The study found an increase in middle school students' *"behavioral engagement".* Students took notes, participated in tests and activities, shared posts, commented and liked in discussion forums, and reviewed notes for assessments, behaviors recognized as indicators of engagement in the literature (Deng et al., 2020b; Deng, 2024; Liu et al., 2024; Wang et al., 2022; Shen et al., 2024). In MOOCs, behavioral engagement also includes activities such as completing quizzes, submitting assignments, and contributing to discussions (Sun et al., 2019). Gamification elements such as points and badges are known to enhance engagement (Taskin & Kilic Cakmak, 2023), and EIN already includes them. However, tracking logs of students' notes, comments, and likes could provide deeper insights into their behavioral engagement.

The study found that middle school students' *"cognitive engagement"* increased after using the EIN platform. Students watched videos, applied their knowledge in tests and exercises, searched for additional resources, reviewed forum posts, and made efforts to achieve learning outcomes. Some students sought extra resources because the video content was insufficient, indicating active efforts to understand the material. Adaptive

strategies such as personalized feedback and peer support can enhance cognitive engagement and study habits (Lestari et al., 2024), while participation in discussion forums and challenging tasks promote deeper learning (Galikyan et al., 2021). Additionally, linguistic features in students' responses can be used to analyze cognitive engagement (Liu et al., 2022b). Gamification elements such as points, badges, leaderboards, and feedback can further encourage active interaction with content (Taskin & Kilic Cakmak, 2023). Integrating these features into EIN may strengthen students' cognitive engagement.

The study found that middle school students' *"affective engagement"* increased after using the EIN platform. Students reported satisfaction with course content, activities, discussion forums, portfolio tracking, and badges, factors commonly linked to affective engagement (Daniels et al., 2016; Deng, 2024; Shin & Song, 2022). Gamification elements in MOOCs can also enhance engagement (Romero-Rodriguez et al., 2019), and giving students control over their learning can increase motivation (Sun et al., 2019). Additionally, fostering communication and relationships within learning communities supports affective engagement (Martin & Borup, 2022). In this context, EIN's discussion forums and gamification features appear to support affective engagement. Further strengthening communication through learning communities and allowing students to plan their own learning processes may further enhance this dimension.

The study found that middle school students' *social engagement* increased after using the EIN platform. Students exchanged ideas in discussion forums, sought help from peers and teachers, and interacted through comments and likes. High-quality forum discussions are known to enhance engagement (Galikyan et al., 2021). Although previous studies suggest that MOOC learners often prefer individual activities to interactive participation (Lan & Hew, 2020), this study found that EIN encouraged active interaction, with students sharing materials and engaging in meaningful discussions.

### Relationship between Themes Related to Middle School Students' Engagement and SRL Experiences

The study's findings indicated that cognitive and behavioral engagement were primarily related to all SRL themes. In addition, self-evaluation and task strategies were associated with all engagement dimensions. Perez-Sanagustin et al. (2021) found that supporting scaffolding SRL strategies in MOOCs increased student engagement. Similarly, Onah et al. (2021) suggested that allowing students to set their own goals, create study plans, and apply appropriate learning strategies in MOOCs supports engagement. Perez-Alvarez et al. (2020) reported that tools designed to support SRL, such as NoteMyProgress, help learners develop critical skills, such as time management and progress monitoring, which, in turn, increase engagement. Kim et al. (2021) also found that SRL strategies positively influence students' participation in courses and help them maintain engagement. Overall, these findings indicate that studies and interventions designed to support SRL in MOOCs can contribute to developing all engagement dimensions.

## LIMITATIONS OF THE STUDY

This study is limited to the English course units for grades 5, 6, 7, and 8 of the middle school English course in Turkiye. Although the EIN platform used in the study includes features common to MOOC platforms, its accessibility is limited to students enrolled in the Ministry of National Education (MoNE). In addition, the study's sample consists only of students in 5th, 6th, 7th, and 8th grades. Future research could examine the effects of using the EIN system in other courses on middle school students' engagement and SRL skills. An experimental research design could more clearly investigate EIN's impact on engagement and SRL. In addition, similar studies could be conducted with high school students to explore their experiences with the EIN platform. In this study, students' SRL and engagement experiences were collected through scales and interviews. Future studies may benefit from using additional data sources, such as learning analytics and system log data, to more comprehensively measure self-regulation and engagement.

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