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# A Technology-Enhanced Student Self-Efficacy Development Program

## Teknoloji Destekli Öğrenci Öz-Yeterlilik Geliştirme Programı

### Abstract

Educational paradigms have rapidly changed depending on novel facilities and needs relevant to technology-enhanced learning environments. In this regard, Self-regulated learning skills (SRL) are one of the significant skills that are argued to be gained in 21st-century for higher education students. This study explores Self-Regulated Learning skills and self-efficacy within the context of educational workshops, which are designed and developed following the Community of Inquiry (CoI) model, conducted at the Center for Innovative Learning and Teaching, Artificial Intelligence (CILT-AI) at a foundation university. Furthermore, it was grounded in Bandura's social-cognitive theory, which emphasizes the primary role of self-efficacy in academic achievement, the study seeks to distinguish the design elements and practical strategies essential for developing self-efficacy among students. In this study, a design-based research methodology is followed, and it integrates insights from literature review, expert opinions, and student feedback to design and implement effective training programs. The workshops target not only to develop participants' academic achievement by leading developed SRL and self-efficacy skills but also to contribute to the broader discourse in educational research. By bridging theory and practice, the study provides actionable insights for educators and researchers to foster self-efficacy involved in self-regulated learning in today's dynamic technology-enhanced educational realm.

***Keywords:*** technology-enhanced learning, self-regulated learning, self-efficacy, community of inquiry, design-based research

### Öz

Eğitim paradigmaları, dijital veya teknolojiyle geliştirilmiş öğrenme ortamlarıyla ilgili yeni olanaklara ve ihtiyaçlara bağlı olarak hızla değişmektedir. Bu bağlamda Öz-Düzenlemeli Öğrenme becerileri, yükseköğretim öğrencileri için 21. yüzyıl becerileri olarak kazanılması gereken önemli becerilerden biridir. Bu çalışma, bir vakıf üniversitesindeki Yenilikçi Öğrenme ve Öğretme, Yapay Zeka Merkezi'nde (CILT-AI) yürütülen ve Sorgulama Topluluğu (CoI) modeline göre tasarlanan ve geliştirilen eğitim atölyeleri bağlamında Öz Düzenlemeli Öğrenme (ÖDÖ) becerilerini ve öz yeterliliği araştırmaktadır. Ayrıca, Bandura'nın öz-yeterliliğin akademik başarıdaki birincil rolünü vurgulayan sosyal-bilişsel teorisine dayanan bu çalışma, öğrenciler arasında öz-yeterliliğin geliştirilmesi için gerekli olan tasarım unsurlarını ve pratik stratejileri ayırt etmeyi amaçlamaktadır. Bu çalışmada tasarım temelli bir araştırma metodolojisi izlenmektedir. Çalışmaya, etkili eğitim programları tasarlamak ve uygulamak için literatür taraması, uzman görüşleri ve öğrenci geri bildirimlerinden elde edilen içgörüler entegre edilmektedir. Atölye çalışmaları, gelişmiş SDÖ ve öz yeterlik becerilerine öncülük ederek katılımcıların akademik başarılarını geliştirmenin yanı sıra eğitim araştırmalarındaki daha geniş söyleme katkıda bulunmak da hedeflemektedir. Teori ve uygulama arasında köprü kuran bu çalışma, günümüzün dinamik teknoloji destekli eğitim alanında öz-düzenlemeli öğrenme ile ilgili öz-yeterliliği teşvik etme noktasında eğitimciler ve araştırmacılar için uygulanabilir görüşler sunmaktadır.

***Anahtar Kelimeler:*** teknoloji destekli öğrenme, öz-düzenlemeli öğrenme, öz-yeterlik, sorgulama topluluğu, tasarım temelli araştırma

BABURESEARCH

## 1. Introduction

In the field of education, it has become even more important for students to understand how to manage their own learning processes in today's rapidly changing world. In this context, the concept of Self-Regulated Learning (SRL) provides a critical framework for students to understand how they can effectively manage their learning processes. Self-Regulated Learning is an umbrella concept which includes the cognitive, metacognitive, behavioral, and emotional aspects of learning with various elements such as cognitive strategies, volition, self-efficacy, etc. (Panadero, 2017). Self-efficacy, a key component of SRL, refers to students' beliefs in successfully completing tasks and achieving goals. With the work we carry out at Ibn Haldun University, we aim to develop SRL and self-efficacy skills among our students. These studies aim to increase students' academic success as well as support them in their lifelong learning journey (Bandura, 1997).

It is known that students' high levels of self-efficacy help them adopt deep learning strategies and persist when faced with difficulties (Honicke & Broadbent, 2016). These abilities are the cornerstones for academic success and lifelong learning. However, developing self-efficacy does not occur in isolation; It is influenced by a variety of factors, including educational strategies. Therefore, it is important to explore and define design elements of training workshops that aim to develop the self-efficacy component as well as conveying knowledge about SRL to students (Zimmerman, 2002).

The research questions guided by the present study are twofold. First, "What are the design elements of a training workshop aimed at achieving and developing self-efficacy, a component of SRL?" This question pushes us to investigate the pedagogical and psychological foundations of effective workshop design, focusing especially on elements aimed at increasing self-efficacy. Secondly, "How to design and implement a training workshop aimed at imparting and developing self-efficacy, a component of SRL?" we ask. This question extends beyond the identification of design elements to explore practical aspects of workshop implementation, including strategies to engage students, facilitate meaningful interactions, and ensure the transfer of skills beyond the workshop setting.

By addressing these questions through workshops with Ibn Haldun University students, we aim not only to contribute to the academic success of our participants, but also to enrich the broader discourse on SRL and self-efficacy in educational research. Our study sits at the intersection of theory and practice, attempting to bridge the gap between what is known about SRL and self-efficacy and how these concepts can be effectively operationalized to promote better learning outcomes. Through this effort, we hope to illuminate ways for educators and researchers to create environments that foster the development of self-regulated, effective learners.

## 2. Literature Review

### 2.1. What is SRL?

In the dynamic landscape of the 21st century, the cultivation of individuals who continuously enhance their knowledge and skills stands as a paramount necessity. This imperative underscores the notion that learning transcends the confines of traditional schooling and should persist throughout one's lifetime. Essential to this lifelong learning paradigm are self-regulation skills, which serve as pivotal determinants not only of academic achievement but also of sustained intellectual growth (Sarı & Akınoğlu, 2009). Defined as the capacity to manage one's own learning process (Aydın & Atalay, 2015), self-regulation embodies a cyclical journey, as posited by Zimmerman (2002), where students meticulously plan tasks, monitor their performance, and engage in reflective practices to refine their approaches for subsequent endeavors. This cyclical nature underscores the tailored and dynamic nature of self-regulated learning, echoing the sentiments of Pintrich and Garcia (1994) regarding the profound influence of students' abilities to regulate their cognition, motivation, and aspirations on the learning process.

Originating from Albert Bandura's social-cognitive learning theory (Schraw, Kauffman & Lehman, 2006), self-regulated learning theory emphasizes the individual's active engagement in assessing their capabilities and behaviors, as initially highlighted by Bandura (Çiltaş, 2011). Moreover, self-regulated learning encompasses deliberate actions and intrinsic cognitive processes geared toward achieving educational objectives, such as exam preparation or paper writing (Aydın & Atalay, 2015). In essence, the concept of self-regulated learning encapsulates a multifaceted approach to education, whereby students autonomously motivate themselves and navigate their learning journeys with purpose and efficacy.

#### 2.1.1. SRL's Criticality in Learning

While some students study hard and cannot be successful, others can study for a very short period of time and achieve the same success or be more successful than those who study for a long time. Therefore, knowing when, where and how to use effective learning strategies is extremely important for students (Çiltaş, 2011). In general, there are views that self-regulated learning is a process that is necessary for academic success and is based on the repertoire of meta-cognitive knowledge and learning strategies rather than the individual's own abilities. Skills in this process are learned through observation and modeling, feedback from others, and consistent practice. As the importance of SRL in this context, models also provide significant motivational support to individuals (Schraw et al., 2006). According to Borkowski (1992), students' feelings of self-efficacy are of great importance in the development of self-regulated learning.

As stated in the studies of Sarı and Akınoğlu (2009), self-regulated learners are active

participants who effectively manage their own learning processes. These students are adept at goal setting, time management, and the use of appropriate strategies. In addition, they analyze their failures to increase their success and, thanks to their acquisition of solution-oriented thinking skills, they find solutions even in situations where external factors may be hindering. Additionally, they interact with other learners in a collaborative learning environment. Teachers have a great responsibility to ensure that learning environments support these features, because self-regulated learning strategies play a critical role in increasing students' success and participation in learning. In this regard, when we look at the education aspect, we see that Bembenutty's (2007) research reveals that self-efficacy belief is critical to effectively prepare future teachers. These findings highlight the importance of pre-service teachers learning how to use self-regulation strategies during their education. The high relationship between teacher candidates' motivational beliefs and self-regulation strategies also strengthen their sense of teaching efficacy. Therefore, ensuring that pre-service teachers use these skills effectively can help future teachers perform their duties successfully.

The significance of self-regulation lies in its role in empowering students to actively assess and enhance their own learning processes. In today's rapidly evolving world, individuals must embody a lifelong learning ethos, characterized by metacognitive awareness and adeptness in evaluating their learning endeavors. Within educational contexts, students lacking self-regulation skills may find themselves easily swayed by immediate impulses, hindering their ability to maintain focus and perseverance. Moreover, without self-evaluation strategies, students risk overlooking areas requiring attention. Self-regulation not only fosters personal accountability for learning but also reinforces the retention of knowledge and skills. Research suggests that self-regulation practices enhance the encoding of information in memory, particularly in tasks like reading comprehension and writing (Zimmerman, 2002). Furthermore, the adoption of self-regulation strategies correlates with heightened student effort, motivation, improved standardized test scores, and overall classroom readiness, emphasizing its pivotal role in shaping successful learners (Chuter, 2020).

### 2.1.2. Examples of SRL Applications

As the most recent example of SRL application, in their 2023 study, Ateş and Atalay aimed to explore the correlation between students' perceived self-regulation abilities and their achievements in Turkish language classes. Their research involved 593 students, comprising 303 fifth graders and 290 eighth graders from public secondary schools in Kars. Employing a simple-random sampling technique, the researchers utilized the "Perceived Self-Regulation Scale" along with a scale they devised to capture students' socio-demographic characteristics. To assess Turkish language proficiency, end-of-term grade point averages were obtained from school administrators. Data analysis was

conducted using the SPSS program, incorporating descriptive statistics and relational screening methods. The findings revealed a significant positive correlation between students' perceptions of their self-regulation skills and their success in Turkish language courses, evident across both fifth and eighth-grade cohorts.

Furthermore, in 2009, Sağırlı and Azapağası embarked on an investigation aimed at assessing the effective utilization of self-regulation skills among university students. Their qualitative study employed descriptive analysis to uncover the activities students engaged in to regulate their self-regulation skills. Data collection techniques included individual and focus group interviews, with analysis conducted using the NVivo program. The research findings indicated that students primarily employed metacognitive self-regulation, organization of time/work environment, repetition, elaboration, learning from peers, organizing and seeking help, critical thinking, and effort regulation as their self-regulation skills. Additionally, concepts such as test anxiety, control of learning beliefs, self-efficacy, goal focus, goal orientation, and task value were prominent in the motivation category.

On the other hand, last but not least, the Science and Art Centers Self-Regulation Psychoeducation Program, prepared by the General Directorate of Special Education and Guidance Services (2022) based on the comprehensive developmental guidance programs model, also provides important examples of the use of SRL. Since the general aim of the program is to enable students to gain self-regulation skills, it was deemed worth mentioning in this section.

### 2.2. What is Self-Efficacy?

Self-efficacy, a concept introduced by Albert Bandura in the 1970s, refers to individuals' belief in their capacity to perform the behaviors necessary to achieve the desired results (Bandura, 1977). Since its emergence, this concept has aroused considerable interest in psychology, education, and many other fields. Self-efficacy, which is based on Bandura's social cognitive theory, makes a significant contribution to human willpower, motivation to take action, and success ( Amin & Özyol, 2020). This cognitive process starts with individuals evaluating their own capacities and what needs to be done. In the ongoing process, individuals predict the potential consequences of the behaviors they will take action (Kotaman, 2008). Bandura emphasized that at the end of such a process, individuals may feel confident in a certain area of their lives as a result of their self-efficacy beliefs, while they may doubt themselves in another area. Bandura underlines that these positive and negative beliefs that individuals form towards themselves in areas where they will take action in their lives contribute to their lives (Altun et al., 2013). Based on this idea, whether individuals' beliefs about themselves are high or low in every field will make them either perfectionists or hopeless individuals who do not present a realistic picture. However, individuals who are aware of what they can or cannot do, make the right

choices in their lives, are hopeful about the future, and have as much self-confidence as they should have.

There are many factors such as past performance achievements, indirect experiences, verbal persuasion, and emotional stimulation that contribute to the development and maintenance of self-efficacy beliefs (Eskici, 2009). Social and cultural factors contribute significantly to the shaping of this interaction process. For example, while positive feedback from outside towards the behavior of individuals or indirectly witnessing the success of others increases self-efficacy belief, negative feedback or social stereotypes may decrease self-efficacy belief (Altun et al., 2013). Based on this, it can be said that it is not possible for an individual to form a self-efficacy belief by ignoring the society in which he/she lives.

Considering the importance of self-efficacy belief in various fields, interventions have been developed to increase this belief. Experiences in which individuals gradually participate in activities that will reveal their competences and self-confidence can be given as examples of these interventions. The cognitive behavioral perspective also offers effective strategies such as reframing negative thoughts and setting achievable goals.

Self-efficacy is a fundamental concept that affects individuals' feelings, thoughts and behaviors in different contexts (Kandemir, 2014). Understanding this concept comprehensively guides interventions to promote positive outcomes in many areas such as education, profession, and health. By enabling individuals to understand their competences, it contributes to improving their resilience and performance.

An important part of the self-efficacy process is cognitive presence, a component of the community of inquiry model (CoI), which involves a series of interconnected steps that promote deep and meaningful learning in educational settings (Garrison, Anderson, & Archer, 2000). The first step is the triggering event, where an attention-grabbing stimulus initiates the cognitive process, encouraging students to engage with the content. This is followed by the exploration process in which students take an active role in deepening their understanding, sharing information, asking questions, and sharing ideas. Then comes the application step in which students critically analyze the information gathered, make connections between the information, and acquire new knowledge. The last step is reflection, in which information is synthesized, learning outcomes are reflected upon, and newly acquired knowledge is transferred to real-world situations (Kılıç, Horzum, & Çakıroğlu, 2016). Effective guidance, collaboration, and reflective dialogue throughout these steps enable students to reach higher levels of cognitive presence and have meaningful learning experiences.

## 3. Methodology

### 3.1. Design-Based Research Method

In this study, a design-based research (DBR) approach was adopted in the design and implementation process of the training program that was conducted by Center for Innovative Learning and Teaching Artificial Intelligence (CILT-AI) at Ibn Haldun University. DBR is an iterative process for improving educational practice while also advancing the theoretical understanding within which that practice is embedded. Design-Based Research (DBR) is commonly used when educators and researchers target to design, implement, and refine educational interventions, to develop curriculums, to integrate technology into the academic courses, and personal development programs (Euler, 2014). In the light of DBR, the following steps below was followed to conduct the study:

*1. Literature Review:* The design process of the program started with a comprehensive review of existing studies in the literature. This screening aims to develop an in-depth understanding of the successes, challenges, and best practices of similar training programs. In particular, studies on Cognitive Presence and student engagement have been carefully examined.

*2. Expert Opinions:* Interviews with experts in the field of education played an important role in developing the content and methods of the program. 6 experts working as researchers at CILT-AI provided valuable feedback on the goals and scope of the program, which helped make it more effective and inclusive.

*3. Student Demands and Needs:* Student demands and needs obtained from course evaluation surveys had a significant impact on the design of the program. This feedback enabled the content and structure of the program to be adjusted to meet students' expectations and enrich their learning experiences.

*4. Design According to Cognitive Presence Steps:* The program is designed based on the Cognitive Presence model, which aims to encourage deep thinking and understanding of information in the learning process. This model provides a framework that allows students to develop problem-solving, critical thinking, and meaningful learning skills. Each component of the program is designed to enable students to deepen their conceptual understanding and actively engage in the learning process.

## 4. Findings

### 4.1. Self-efficacy Lesson Plan

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| **1** | To grab the attention of learners, initially, the success stories of two well- known people who have high levels of self-efficacy were represented, and students were asked what these individuals have in common that enabled them to achieve success. |
| **2** | Based on the students' answers, the concept of self-efficacy is emphasized and important information about the concept is conveyed to the students. This process is accompanied by questions and evaluations from the students. |
| **3** | The students are divided into groups of 3 or 4 and a case study on "Developing self-efficacy in a high school student" is carried out in order to transfer the knowledge learnt. At the end of the process, students share their ideas and an evaluation is made. |
| **4** | At the end of the training, students expressed what they learnt and they were asked to share and discuss their ideas with other students. |

#### 4.1.1 Triggering Event

In order to draw attention to the concept of self-efficacy and to arouse students' interest in the subject, the success stories of Jeff Bezos, the founder of the Amazon application, and Peter Dinklage, a world-renowned actor famous for the Game of Thrones series, are told in a way that does not bore students and excites them. Afterwards, the students are asked the question "What do these people have in common that enabled them to achieve success?". All students are encouraged to answer. At this point, active participation is expected from the students. At the end of the process, the answers of all students are gathered in a common denominator and a short summary is made and the next step is taken for the transition to the subject.

#### 4.1.2 Exploration

Based on the students' answers, the concept of self-efficacy is emphasized. This process is accompanied by an interactive slide with interesting visuals that will attract the attention of the students and guide the narrator. The exploration process starts with the definition of self-efficacy. Afterward, the variables affecting the self-efficacy beliefs of individuals and why this concept is important are emphasized. Then, the characteristics of individuals with high and low self-efficacy are mentioned. Finally, strategies and development processes are explained within the scope of developing and evaluating self-efficacy. In the process of sharing information, questions, and evaluations from students are discussed.

### 4.1.3 Application

A case study is conducted in order to utilize the information shared by the students. Firstly, the students are divided into groups of 3 or 4 depending on their number. Afterward, the case about the development of self-efficacy of a high school student is shared with the students and the students are asked to discuss for 10-15 minutes how to carry out the evaluation and development process about the student who has problems with self-efficacy in the case. In this process, students will rethink what they have learnt in the exploration phase and will have the experience of making sense of what they have learnt. This will contribute to the permanence of their knowledge. At the end of the process, one student from each group is asked to share on behalf of their group. As a result of the students' sharing, this step is finalized with a short summary and evaluation of students' ideas.

### 4.1.4 Reflection

In order for the students to evaluate the information they have learnt and raise awareness about what they have learnt, the question "What did we learn today?" is conveyed through the Padlet application and they are asked to write what they have learnt in a few sentences. After waiting for a few minutes, the students' posts were read and the training ended with a short conclusion.

In summary, the teaching of the concept of self-efficacy is carried out in an interactive way in which students are actively involved. This training programme, which is followed in four steps, is designed to attract students' interest in the subject, increase their attention span, encourage their active participation, and enable them to adapt it to their real-life practices.

## 5. Discussion

In this study, we have endeavored to explore the intricate relationship between Self-Regulated Learning (SRL) and self-efficacy within the context of educational workshops designed for students at Ibn Haldun University. Our investigation stems from the recognition of the paramount importance of students' ability to manage their own learning processes, particularly in today's rapidly changing educational landscape. The concept of SRL provides a critical framework through which students can understand and effectively navigate their learning journeys. Central to this framework is the notion of self-efficacy, which encapsulates students' beliefs in their capacity to accomplish tasks and achieve their academic goals (Bandura, 1997). Our study aligns with existing research indicating that high levels of self-efficacy among students facilitate the adoption of deep learning strategies and promote persistence in the face of challenges (Honicke & Broadbent, 2016).

The research questions that have guided our study are twofold. Firstly, we sought to discern the design elements essential for creating effective training workshops aimed at enhancing self-efficacy as a component of SRL. This inquiry necessitated a deep exploration of the pedagogical and psychological underpinnings of workshop design, with a particular focus on elements conducive to bolstering self-efficacy beliefs among students. Secondly, we endeavored to delineate practical strategies for the design and implementation of training workshops geared toward imparting and nurturing self-efficacy within the framework of SRL. This broader inquiry delved into strategies for engaging students, fostering meaningful interactions, and facilitating the transfer of skills acquired during workshops to real-world academic settings.

By addressing these research questions through workshops conducted with Ibn Haldun University students, our aim is not only to enhance participants' academic success but also to contribute to the broader discourse on SRL and self-efficacy in educational research. Situated at the intersection of theory and practice, our study seeks to bridge the gap between theoretical insights into SRL and self-efficacy and their practical application in educational contexts.

Lastly, to sum up, our study represents a concerted effort to translate theoretical knowledge into actionable strategies aimed at fostering self-regulated, effective learners. Through our endeavors, we hope to provide educators and researchers with valuable insights into creating environments that nurture the development of self-efficacy and promote better learning outcomes among students.

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