Doi: 10.30473/IDEJ.2025.70979.1190 **ISSN:** 2588-4476

Iranian Distance Education Journal

Vol. 6, No. 2, Summer-Autumn 2024 (P 131-140), Payame Noor University

Original Article

On Iranian Teachers' Self-efficacy as a predictor of Tendency to Integrate Technology in Teaching

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Received: 2024/07/22 **Accepted:** 2024/10/22

Abstract

This study aims to investigate the relationship between teachers' self-efficacy and their tendency for integrating technology in teaching. Additionally, the contribution of teachers' self-efficacy variables in predicting their tendency to use technology in teaching is measured. This research is applied in terms of its objective and descriptive-correlational in terms of data collection. A sample of 175 teachers (109 females and 66 males) from the Safir Gofteman Institute were selected as the participants considering convenience sampling method, while the statistical population encompassed 324 teachers. The participants completed three questionnaires: Skaalvic and Skaalvic Norwegian Teacher's self-efficacy scale with Cronbach's alphas of 0.98, Browne's Technology Integration confidence scale (2009) with Cronbach's alphas of 0.95 and a demographic information questionnaire. It is indicated that the teachers' self-efficacy and technology integration intention are at satisfactory level. Correlation between self-efficacy and technology integration intention is .30 which shows positive direct relationship between these two variables. Moreover teachers' self-efficacy is of power to predict teachers' intention to integrate technology in teaching.

Keywords

Self-efficacy, Teaching, Technology Integration Tendency.

Introduction

Today, the use of technology in various aspects of life, especially in the learning environment, is inevitable. Technology has played a constructive role in facilitating learning in recent years. Teachers' tendency to use technology can play a fundamental role in integrating technology into classrooms. In fact, even if the facilities related to technology are available and there are practical recommendations for its implementation in the classroom, it cannot be guaranteed that technology will be used in classrooms unless teachers show a tendency to use it. In fact, teachers play a key role in the effective integration of technology into classrooms. Teachers' beliefs can have a significant impact on various dimensions of their teaching, including technology integration in the classroom. Albion (1999) states that research shows a direct relationship between teachers' self-efficacy regarding technology integration and what actually happens in the classroom. Teachers' self-efficacy, as their judgment of their abilities to fulfill teaching tasks, can indicate their tendency to employ innovations, new methods, and technology in the classroom. Understanding a teacher's mental image of their abilities and teaching style can help us predict their approach to using technology in the classroom. In the context of teaching, self-efficacy is the teacher's response to the question of whether they can employ the necessary planning, thoughts, and actions to fulfill their responsibilities. In fact, teachers' self-efficacy is a concept

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that is combined with successful teaching and teacher influence (Goddard, Hoy & Hoy, 2004).

Self-efficacy:

Bandura (1997) defines self-efficacy as "an individual's judgment of their capabilities to organize and execute courses of action required to attain designated types of performances." What makes this concept noteworthy is that it involves individual self-appraisal of their own abilities, thus enhancing their cognitive capacities. In addition, it emphasizes the individual's capacities and internal abilities that align with the necessary skills for lifelong learning, which plays a vital role in the context of learning today. In the world of information and communication, individuals constantly need to learn and improve their skills. Sometimes formal education seems unable to keep pace with the ever-changing needs of individuals. The need for lifelong learning and awareness of internal capabilities can be regarded as two influential components in today's learning world. Self-efficacy is a combination of cognitive, social, emotional, and behavioral skills required to perform a task correctly and adapt effectively to the intended situation. It not only addresses an individual's judgment of possessing these abilities but also their judgment of how they can perform adequately with these skills in a specific situation (Bandura, 1977).

Technology integration in education:

Wozney, Venkatesh & Abramy (2006) believe that student-centered approaches encourage teachers to change their teaching strategies and promote computer-based technology integration in the curriculum. Furthermore, the development of the web, along with interactive and collaborative educational software, has transformed technologies into powerful and flexible tools. With the widespread coverage of high-speed internet networks, the increasing adoption of computers and smartphones by users, and the integration of technology into everyday activities for ordinary people, significant changes are expected to take place in the field of technology use in learning environments.

However, some researchers, including Hadley & Sheingold (1993), have concluded in their studies that technologies often have a peripheral role in learning and are considered as an additional activity to the organizational structure or simply limited to electronic versions of homework assignments. Some studies have investigated the relationship between teachers' self-efficacy beliefs and their tendency toward technology integration (Hill, Smith, & Mann, 1987; Albion, 1999; Schere, Tondeur, Siddiq & Baran, 2017), with only one case (Tork, 2013) conducted in Iran and among elementary school students. Furthermore, the power of teachers' self-efficacy beliefs in predicting their tendency toward technology integration has been examined in several studies (Pan & Franklin, 2011; Anderson, Groulx & Maninger, 2011; Celik & Yesilyurt, 2013; Yesilyurt, Ulas & Akan, 2016; Li, Li, & Franklin, 2016), revealing the lack of conducting such research in the Iranian context.

Significance of study:

The importance and necessity of conducting this research are highlighted by Bentley (2017), who points out that despite significant advancements in technology in society over the past decade, the field of education still lags behind in the application and implementation of technology in the classroom (Bush & Wise, 2010; Delgado et al., 2015, as cited in Bentley,2007). This researcher also believes that the new paradigm shift, which includes technology integration in the classroom, presents interesting subjects in today's educational spaces. These subjects identify the most effective tools for technology integration, including: 1) transforming the traditional classroom into a student-centered learning environment, 2) assisting teachers in using technology integration for scaffolding techniques throughout the learning process as students' progress from one stage to the next, 3) helping teachers innovate and enhance teaching skills, and 4) fostering a sense of community throughout the school year. These are the subjects that should be addressed specifically in the context of technology integration in learning, particularly in the school

environment. Since the integration of technology into the classroom depends on factors such as teachers' tendency to use technology, any factor that can help understand teachers' beliefs, their approach to technology, and overcome potential barriers will be valuable. Teachers' beliefs, including self-efficacy, influence their decisions regarding teaching and instructional improvement. Teachers' self-efficacy, in particular, is an important belief in teaching and can be related to their approach to technology integration in the classroom (Hill, Smith, & Mann,1987; Albion, 1999; Tork, 2013; Scherer, Tondeur, Saddiq & Baran, 2017) or even predict it (Pan & Franklin, 2011; Anderson, Groulx, & Maninger, 2011; Celik & Yesilyurt, 2013; Yesilyurt, Ulas & Akan, 2016; Li, Li, & Franklin, 2016). However, Mishne (2012) believes that self-efficacy cannot predict technology integration skills. The summary of previous research indicates a significant relationship between teachers' self-efficacy and their tendency towards technology integration in the classroom. Moreover, teachers' self-efficacy can often be one of the predictive factors of their tendency towards technology integration in the classroom.

Regarding the importance of technology integration in the classroom, the introduction of communication technologies into students' daily lives and the need to create diversity and attractiveness in the teaching process, most language education institutions aspire to encourage their teachers to use technology in teaching. By utilizing the capabilities of technology, teaching can be conducted in diverse formats that are close to learners' preferences and suitable for their interests and abilities.Studying the level of teachers' self-efficacy and its impact on their tendency to integrate technology can help us reduce inhibiting factors and focus on strengthening influential elements in teachers' tendency toward technology integration in the classroom. As the sample used in this research, Safir Gofteman Institute has a positive approach to technology integration in language teaching, encouraging teachers to effectively use educational technology in classrooms and emphasizing the exploration of inhibiting factors and strengthening facilitating factors of technology integration in the classroom, examining teachers' self-efficacy beliefs can contribute to a better understanding of the Research and Development Department's knowledge of teachers' beliefs and let the plan for their in-service training more precisely.

Considering the research gap in studying the relationship between self-efficacy and its components with teachers' tendency towards technology integration in the educational context of Iran, this study examines the relationship between teachers' self-efficacy and their tendency towards technology integration in teaching, Moreover, the portions that go to each of six self-efficacy components are investigated in details. Current study also investigates the strength of each component of self-efficacy in predicting teachers' tendency towards technology integration in teaching. Teachers' tendency to use technology can indicate their readiness to teach with a hybrid approach and provide a more accurate understanding of teachers' preferences and technology-related capabilities to the Research and Development Department. The results of this study can provide a more accurate understanding of teachers' self-efficacy and significantly assist the planning of the institute towards its educational goals, which include the development of hybrid learning.

Materials and Methods:

This research is applied in terms of its objective and descriptive-correlational in terms of data collection. A sample of 175 teachers (109 females and 66 males) from the Safir Gofteman Institute were selected as the participants considering convenience sampling method, while the statistical population encompassed 324 teachers. They completed three questionnaires: Skaalvik & Skaalvik Norwegian Teacher's self-efficacy scale (2007), Browne's Technology Integration confidence scale (2009) and a demographic information questionnaire. To gather information about teachers' self-efficacy, the Norwegian Teacher self-efficacy scale by Skaalvik & Skaalvik (2007) has been used. This questionnaire examines six key components of teachers' self-efficacy and provides information about their self-efficacy beliefs. The six components of self-efficacy based on this

scale are:1) instruction, 2) adapt instruction to individual needs, 3) motivate students,4) maintain discipline, 5) cooperate with colleagues& parents, 6) cope with change. To score the questionnaire, a 4 level Likert Scale was used with highest score, 4, allocating to completely sure and the lowest score, 1, to not sure at all. Cronbach's alphas for this questionnaires was reported 85% for the original scale and 98% for the translated one in current research. To gather information about tendency for technology integration in teaching,), Browne's Technology Integration confidence scale (2009) was used which was developed in New York state university by himself and consisted of 28 statements. In order to score the questionnaire, a 4 level Likert Scale was used with highest score, 4, given to completely sure and the lowest score, 1, to not sure at all. Cronbach's alphas for this questionnaires was reported 85% for the original scale and 95% for the translated one in current research. Moreover, a demographic information questionnaire was used to gather information on participants' age, gander, major, place of work, experience and computer courses they have passed. The results were analyzed using SPSS version 26.

Research hypotheses:

1. Hypothesis 1: There is a significant and direct relationship between the self-efficacy of teachers and their tendency to use technology in teaching.
2. Hypothesis 2: The self-efficacy of teachers can predict their tendency to use technology in teaching.
3. Hypothesis 3: The contribution of teachers' self-efficacy components in predicting their tendency to use technology in teaching varies.

Results:

To investigate the first hypothesis of the research, titled "the relationship between teachers' self-efficacy and their tendency to use technology in teaching," we used a correlation test.

For testing the relationship between teachers' self-efficacy and their tendency to use technology, we have the following hypotheses:

H0: There is no significant relationship between the self-efficacy of teachers and their tendency to use technology.

H1: There is a significant relationship between the self-efficacy of teachers and their tendency to use technology.

Table 1 presents the correlation coefficient, coefficient of determination, adjusted coefficient of determination, and standard error estimate between the self-efficacy of teachers and their tendency to use technology. The correlation coefficient value between the two variables at a 95% confidence level and with a sample size of 175 is 0.308, indicating a positive and direct; though not very strong, relationship between the self-efficacy of English language teachers and their tendency to use technology. The coefficient of determination between the two variables is 0.095, indicating that 10% of the variation in the tendency to use technology is influenced by the self-efficacy of teachers. Therefore, the main hypothesis of the research is confirmed.

Table 1. Correlation coefficient between teachers' self-efficacy and tendency to use technology

Independent Variable	Dependent Variable	Correlation Coefficient	Coefficient of Determination	Adjusted Coefficient of Determination	Standard Error Estimate
Teachers' Self-efficacy	Tendency to use Technology	0.308	0.095	0.090	7.23036

In this section, linear regression is used to examine the predictive ability of teachers' self-efficacy and its components in predicting teachers' tendency to integrate technology in teaching. Examining the power of teachers' self-efficacy in predicting teachers' tendency to integrate

technology in teaching:

To test the second hypothesis of research, regression analysis is used. For testing the linear relationship and predictive power of teachers' self-efficacy for tendency to integrate technology in teaching, we have the following hypotheses:

H0: Teachers' self-efficacy does not predict tendency to use technology.

H1: Teachers' self-efficacy predicts tendency to use technology.

Considering that the value of the significance level in Table 2 is less than 0.01 and the Fisher Statistic is 18.170, the hypothesis H0 is rejected. Therefore, teachers' self-efficacy has the power to predict their tendency to use technology.

Table 2. Analysis of Variance test between teachers' self- efficacy and tendency to use technology

	Sum of Squares	Degree of Freedom	Mean Square	Fisher Statistic	Significance Level
Regression	949/893	1	949/893	18/170	0/00
Residual	9044/107	173	52/278		
Total	994/000	174			

Table 3 presents the standardized and non-standardized coefficients between teachers' self-efficacy and tendency to use technology. In this table, the constant value (a = 64.772) and the t-statistic at the constant value (t = 16.444) with its significance level ($p < 0.05$) are provided, indicating that the null hypothesis of the constant value being zero is rejected. For the variable of teachers' self-efficacy, the non-standardized coefficient (b = 0.211) is given. Since the t-statistic for the teachers' self-efficacy is 4.263 with a significance level ($p < 0.01$), the null hypothesis of beta being zero at this level is rejected.

Table 3. Standardized and non-standardized coefficients between teachers' self-efficacy and tendency to use technology

Model	Non-Standardized Coefficient		Standardized Coefficient	t	Significance Level
	Standard Error	B	Beta		
Constant	3/939	64/772		16/444	0/00
Teachers' self-efficacy	0/050	0/211	0/308	4/263	0/00

Considering that the non-standardized coefficient in Table 3 is 0.211, a one-unit change in teachers' self-efficacy will result in a change of 0.211 in their tendency to use technology in the regression equation.

Based on Table 4, the prioritization of the components of teachers' self-efficacy in predicting their tendency to use technology is presented. According to this table, the prioritization is as follows: Cooperate with colleagues & parents with a determination coefficient of 0.052 in the first priority, and adapt instruction to individual needs with a determination coefficient of 0.007 in the sixth priority. The results obtained from the correlation and determination coefficients of the self-efficacy components confirm the third hypothesis of the research.

Table 4. Prioritization of teachers' self-efficacy components based on correlation and determination coefficients

Independent variable	Dependent Variable	Correlation Coefficient	Determination Coefficient	Priority
Instruction	Tendency for Technology Integration	0/202	0/041	2
Adapt instruction to individual needs		0/081	0/007	6
Motivate students		0/176	0/031	4

Independent variable	Dependent Variable	Correlation Coefficient	Determination Coefficient	Priority
Maintain discipline		0/184	0/034	3
Cooperate with colleagues & parents		0/227	0/052	1
Cope with changes		0/162	0/026	5

Discussion

According to the results obtained in the investigation of the first hypothesis of the research between the self-efficacy of teachers and their tendency toward technology integration in teaching, there is a direct and positive relationship. This result is consistent with the findings of Scherer, Tondeur, Siddiq and Baran (2017), Teweed (2013), Tork (2013), Baubeng-Ando (2012), Teo, Ursavas, Bahcekapili (2012), Player-Koro (2012), Teo (2009), Sang, Valcke, Van Braak, and Tondeur (2009), Anderson and Manninger (2007), Hill, Smith, and Mann (1987). In contrast to the predominant trend observed in studies on this topic, some studies did not find a significant relationship between teachers' self-efficacy and their tendency toward technology integration in teaching, Aypay, Coskun Celik, Aypay and Sever (2012) and Jafari Trojani, Gholamali Lavasani, Karmdoust, and Hasan Abadi (2013).

Considering that self-efficacy in the Skaalvik and Skaalvik (2007) scale includes a set of teachers' skills for teaching, such as instruction, maintain discipline, cooperate with parents and colleagues, adapt instruction to individual needs, motivate students, and cope with change, it evaluates teachers' abilities to achieve educational goals from various aspects. Higher self-efficacy can indicate that these teachers have the necessary capabilities to utilize various elements to achieve educational goals. As Wood and Bandura (1989) define it, "believing in one's capabilities to mobilize motivation, cognitive resources, and necessary methods according to demands of each situation." Since technology integration in teaching is also one of the available elements to assist teachers in achieving educational goals, it seems that teachers with desirable self-efficacy would also have a desire for technology integration in teaching. This understanding facilitates the perception of a direct and positive relationship between self-efficacy and the tendency toward technology integration by teachers.

Based on the results obtained in the investigation of the second hypothesis of the study, self-efficacy can predict the level of English language teachers' tendency toward technology integration. This finding is consistent with the findings of Li, Li and Franklin (2016), Yesilyurt, Ulas, and Akan (2016), Kale and Goh (2014), Celik and Yesilyurt (2013), van Acker, van Buuren, Kreijns, and Vermeulen (2013), Teo, Ursavas and Bacekapili (2012), Sadaf, Newby, and Ertmer (2012), Anderson, Grolux, and Manninger (2011), Pan and Franklin (2011), Sang, Valcke, van Braak, and Tondeur (2009), Anderson and Maninger (2007), Liaw, Huang, and Chen (2007), and Littrell, Zagumny, and Zagumny (2005). Although the predominant results of studies in this field indicate the power of self-efficacy in predicting teachers' tendency toward technology integration in teaching, the results of Mishne's study (2012) in the form of a doctoral dissertation show that self-efficacy does not have the power to make such predictions. As mentioned earlier in the analysis of the main hypothesis of the study, self-efficacy of teachers can provide an estimate of teachers' abilities to guide educational activities and learners toward predefined institutional goals. The higher the teacher's self-efficacy, the higher their beliefs in their abilities to organize resources to achieve higher educational goals. Technology integration in teaching can also be one of the tools that teachers use in appropriate conditions to achieve a part of their educational goals. With the definitions mentioned, higher self-efficacy understands the expectation that teachers with higher self-efficacy are more likely to have a higher tendency toward technology integration in teaching.

Based on the results obtained in the investigation of the third hypothesis of the study, the contribution of self-efficacy components in predicting teachers' tendency toward technology

integration in teaching is different. Among the six components defined for self-efficacy in the Skaalvik and Skaalvik scale (2007), the components of cooperate with colleagues and parents and instruction are in the first and second ranks, and the components of cope with change and adapt instruction to individual needs are in the fifth and sixth ranks. The ability to maintain discipline and motivate students also ranked third and fourth, respectively.

However, in a study conducted by Sang, Valcke, van Braak, and Tondeur (2009) on Chinese teachers, variables such as constructive beliefs, teaching self-efficacy, computer self-efficacy, and behavior towards computers contributed to predicting the future use of technology by teachers; with the highest contribution belonging to the behavior towards computers (36%) and the lowest contribution belonging to teaching self-efficacy (0.06%).

In the same vein, the regression analysis results of the study by Liaw, Huang , and Chen (2007) also showed that perceived usefulness with 57% and perceived self-efficacy with 21% can predict the behavioral tendency of instructors to use e-learning, and the contribution of perceived usefulness (57%) was greater in this prediction.

In other previous studies in this field, various components have also contributed to predicting teachers' tendency toward technology integration in teaching. For example, Teo, Ursavas and Bacekapili (2012), concluded in a study at the University of Rize in northeastern Turkey, teachers' perception of the usefulness of technology, their behavior towards computer usage, and computer self-efficacy directly influenced their tendency for technology integration. These three variables explained 39% of the variations in teachers' behavioral tendencys to use technology. Furthermore, the regression analysis results in the study by Sadaf, Newby, and Ertmer (2012), which aimed to explore the predictive factors of teachers' tendency toward web 2.0 technology integration, showed that the combined factors of resource facilitation, technology facilitation, and self-efficacy accounted for a significant amount of variance (62.2%) in perceived behavioral control. Additionally, the path analysis results indicated that self-efficacy had the greatest impact on perceived behavioral control, which in turn had the strongest influence on teachers' tendency toward web 2.0 technology integration in teaching. Moreover, Teo (2009), in a study on teachers in Singapore, measured self-efficacy through three factors: basic teaching skills, advanced teaching skills, and technology for instruction and found a significant relationship between basic teaching skills, technology for instruction, traditional technology use, and constructivist technology use. Anderson and Maninger (2007) also identified the best predictors of software usage in teaching among their examined student teachers at the University of Texas, which were self-efficacy, gender, and value beliefs.

Conclusion

Considering the results of the present study, where the components of collaboration skills with colleagues and parents and teaching skills ranked first and second in predicting teachers' tendency toward technology integration, and the components of coping with changes and adapting teaching to learners' needs ranked fifth and sixth, a closer look can be taken at the importance of these components in teachers' self-efficacy within the institution. Since interaction with colleagues within and outside the units is a significant aspect within the institution and establishing appropriate relationships with learners' parents is highly important, it can be said that teachers within the institution are obligated to strengthen these high-level skills to uphold organizational principles. Moreover, teachers' high-level teaching skills have been achieved through continuous evaluations by the training teams within the units and also due to the various criteria and comprehensive evaluations in the lecturer recruitment process. Therefore, it appears that the criteria and requirements of the institution have led to further strengthening of these self-efficacy components in English language teachers. On the other hand, the components of coping with changes and adapting teaching to learners' needs rank fifth and sixth in predicting the tendency toward technology integration. Since all educational materials, teaching syllabi for each session,

midterm and final exams, film sessions, etc., are prepared in a coordinated manner by the central office departments and are mandatory in all units, it seems that teachers have no freedom to change the course materials, allocate time for each section, or remove any parts. Therefore, even if some learners need additional practice in a specific section or skill, the respective teacher is required to provide individual solutions at home. Teachers can only adopt methods and techniques that are suitable for learners' learning styles (auditory, visual, kinesthetic, etc.) to deliver certain parts of the lessons. In other words, teachers in the institution are only obliged to implement the predetermined curriculum, and the skill of adapting teaching to learners' needs is not significantly strengthened in them. It appears that this coordinated approach to teaching implementation has led to teachers in the institution not being significantly strengthened in their ability to cope with changes. Any changes in educational materials, methods, and instructions are communicated to teachers by the training team through the central office, and training sessions and group work among teachers are designed and implemented based on each change and new approach. Therefore, teachers gradually and in coordination with the support of the training teams and their colleagues adapt to the changes and provide necessary feedback to the training team at all stages for reflection to the central office. It seems that this procedure has led teachers not to see the need to strengthen their skill of coping with changes within themselves.

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