# The Relationship Between Primary School Teachers' Perceptions of 21st Century Skills And Digital Literacy Level

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## ABSTRACT

In the 21st century, individuals are exposed to technology from the moment they are born. They are expected to master 21st century skills and digital literacy in order to use technology appropriately, safely, and effectively and keep up with the times. The 21st century skills and digital literacy of primary school teachers, who form the basis of individuals' learning and lead them, are of great importance. For this reason, in this study, primary school teachers' perceptions of 21st century skills proficiency, their digital literacy levels, and the relationship between them were examined. A relational survey model was used. The "21st Century Skills and Competences Scale" and "Digital Literacy Scale" were used in data collection. The results showed that the participants' 21st century skills proficiency and digital literacy levels were high. No significant difference was found in the 21st century skills proficiency perceptions of the participants with regard to gender or work experience. In addition, a significant difference was found in favor of male participants in digital literacy levels, whereas the digital literacy levels of the participants did not differ by work experience. Furthermore, there was a moderate, positive, and significant relationship between the participants' perceptions of 21st century skills proficiency and their digital literacy levels. Finally, the results of the simple linear regression analysis, revealed that the digital literacy levels of the participants were an important predictor of 21st century skills.

**Keywords:** 21st century skills, digital literacy, primary school teachers

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## INTRODUCTION

Throughout the years, significant developments and transformations have taken place in technology, education, the economy, science, and many other fields. The needs and expectations of societies in the information age have become much more different from other centuries as a result of the integration of technology into our lives. In line with the changing conditions and needs, several skills have emerged in order for individuals to adapt to the age they live in. These skills are called 21st century skills. Developing technology has brought digital literacy skills and 21st century skills into our lives. Teachers play a significant role in educating individuals who can adapt to the age we live in. Therefore, teachers' 21st century skill competencies and digital literacy levels are of great importance.

### 21 st Century Skills

Current scientific and technological developments, the coexistence of people from various cultures and societies, and the effects of problems such as natural disasters and war on human life in many areas have required individuals to adapt to new situations (Gürültü, Aslan & Alcı, 2018; Rotherdam & Willingham, 2009). In order to adapt to the changes in the 21st century, some skills that individuals should possess have been identified by a number of institutions, scientists, and educators. In addition to skills such as communication, critical thinking, and creativity, which were considered important in the past, the new skills consist of skills such as being collaborative, following the innovations in information technology with the advancement of technology, and having technology literacy in order to adapt and use it appropriately (Ekici, Abide, Canbolat & Öztürk, 2017; Brantley,2017; Silva,2009).

Various institutions such as P21, OECD, ATSC21, NRC, ISTE, IOWA, MEB and scientists have proposed different definitions and classifications of these skills and called them 21st century skills. 21st century skills have been developed as a result of feedback from experts, business people, and teachers to explain and investigate the knowledge and skills that students need to be successful in life and business, as well as the infrastructure required for these skills (Larson & Miller, 2011; P21, 2009).

**Table 1**. *Partnership for 21st century skills (P21, 2009)*

| Learning and Innovation Skills | Information, Media and Technology Skills | Life and Career Skills |
|---|---|---|
| • Creativity and Innovation<br>• Critical Thinking and Problem Solving<br>• Communication and Collaboration | • Information Literacy<br>• Information and Communications and Technology (ICT) Literacy<br>• Media Literacy | • Flexibility and Adaptability<br>• Leadership and Responsibility<br>• Productivity and Accountability<br>• Social and Cross-Cultural Skills |

### Digital Literacy

In the information age, technology has developed and progressed in a very rapid way. As a result, technological and digital tools have become widespread in society (Sivrikaya, 2020; Baterna, Mina & Rogayan Jr, 2020). These tools enable people to access information in a quick way and communicate despite distances (Pagani, Argentin, Gui & Stanca, 2016). The rapid access to information and the abundance of information in the information age have led to some problems. Several problems, such as misuse of technology, inability to reach the correct information, decrease in creativity, or access to ready-made information immediately, are among the highlighted problems (Cansoy, 2018). There is a huge amount of information pollution in digital environments, and therefore, people need to make a distinction between accurate and false information. This requires a skill called digital literacy.

Digital literacy has become important in this age where technology has integrated into our lives considerably. Even so it was defined as a survival skill (Eshet- Alkai, 2004). Individuals possessing this skill have the ability to research, question, analyze, and evaluate (Duran & Özen, 2018). Individuals with digital literacy are expected to follow the latest developments and pay attention to moral issues by complying with legal processes in a safe and correct way, as they are intertwined with technology and can effectively use the tools this technology brings. (Bulut & Karasakaloğlu, 2018; Acar, 2015).

### Teacher Roles

In the 21st century, individuals live together with technology from the moment they are born. A generation engaged with technology, is growing up with tools such as phones, televisions, computers, tablets, and smart boards from an early age (Anisimova,2020; Pangrazio, Godhe & Ledesma, 2020). This generation needs to possess 21st century skills and digital literacy in order to use technology in an appropriate, safe, and effective way and to adapt to the age they are in (Cebeci, 2020).These skills can be developed in schools, which are the institutions where education and training are held. Preparing students for the 21st century has long been the most important task of teachers, who are part of a global heritage (Genzon, 2009; Kalash, 2011). For this reason, teachers should possess 21st-century skills and digital literacy. The mastery of these skills by primary school teachers, who provide the most basic education to students and guide and lead them, is of particular importance. Therefore, this study aimed to examine primary school

teachers' 21st century skill proficiency perceptions and digital literacy levels and the relationship between them.

## RESEARCH METHOD

### Research Model

In this study, the descriptive research method and relational survey model were adopted. Descriptive research is conducted to explain a phenomenon, analyze and evaluate results, examine situations and conclude relationships between them (Çepni, 2007). The relational survey model describes a phenomenon and examines the relationship and effect of the variables that lead to it (Kaya, Balay & Göçen, 2012). The descriptive research model and relational survey design were preferred in order to examine the 21st century skills and digital literacy levels of primary school teachers in detail and to analyze the relationship between them.

### Participants

283 primary school teachers working in the center of Elazig in the 2020-2021 academic year participated in the study. Simple random sampling was used in sampling selection. This method is effective as it ensures obtaining an effective sample that represents the universe and generalizing statistical interpretations (Gay, Mills & Airasian, 2009).

The reason for including primary school teachers in the study was that having 21st century learner and teacher skills and digital literacy skills from an early age is of great importance. Thus, primary school teachers who provide education to young children, should have 21st century and digital literacy skills (Kıyasoğlu, 2019). The demographic information of the participants is presented in Table 2.

**Table 2.** *Demographic information of the participants*

| Variables | Groups | Frequency(n) | Percentage(%) |
|---|---|---|---|
| Gender | Female | 145 | 51,2 |
| | Male | 138 | 48,8 |
| | Total | 283 | 100 |
| Work Experience | 1-5 years | 28 | 9,9 |
| | 6-10 years | 35 | 12,4 |
| | 11-15 years | 47 | 16,6 |
| | 16 and above | 173 | 61,6 |
| | Total | 283 | 100 |

In order to collect the data, the administrations of the schools of the primary teachers working in public schools in Elazig were contacted. The data were collected face to face by the researcher.

### Data Collection Tool

### The 21st Century Skills and Competences Scale

In data collection, the *21st Century Skills and Competences Scale* (Anagün, Atalay, Kılıç & Yaşar, 2016) was used. In the scale development studies, the Cronbach's alpha value of the scale was found to be .88. In this study, the Cronbach's Alpha value was calculated as .95. The KMO and Bartlett's test values of the scale were found to be .922 and 6913.45, respectively. The scale consists of 42 items and 3 dimensions, which are Learning and Innovation Skills, Life and Career Skills, and Information, Media and Technology Skills.

### The Digital Literacy Scale

The Digital Literacy Scale developed by Ng (2012) and adapted into Turkish by Hamutoğlu, Güngören, Uyanık, and Erdoğan (2017) was used. The Cronbach's alpha value of the scale was found to be .93 in the original study, whereas it was found .90 in the present study, which indicated that the scale was reliable. The KMO and Bartlett's test values of the scale were found to be .89 and 2387.36, respectively. The scale consists of 17 items and no reverse-scored item. The scale has four dimensions: Attitude, Technical, Cognitive, and Social-emotional.

**Data Analysis**

In the study, the data were analyzed using quantitative research methods. The SPSS 22.0 program was used in data analysis. The skewness and kurtosis values of the scales and the dimensions of the scales were calculated in order to reveal whether the data were normally distributed.

**Table 3.** *The skewness and kurtosis values*

| Scales | Skewness | | Kurtosis | |
|---|---|---|---|---|
| | Value | Std. Er. | Value | Std. Er. |
| 21st Century Skills and Competences Scale | -,171 | ,145 | -,039 | ,289 |
| Learning and Innovation Skills | -,241 | ,145 | -,264 | ,289 |
| Life and Career Skills | ,321 | ,145 | ,222 | ,289 |
| Information, Media and Technology Skills | -,116 | ,145 | -,297 | ,289 |
| Digital Literacy Scale | -,458 | ,145 | ,331 | ,289 |
| Attitude | -,760 | ,145 | 1,04 | ,289 |
| Technical | -,509 | ,145 | ,220 | ,289 |
| Cognitive | ,363 | ,145 | ,142 | ,289 |
| Social-emotional | -,421 | ,145 | -,400 | ,289 |

The results showed that the scales had a normal distribution. In order for the data to have a normal distribution, the skewness and kurtosis values must be between +1.5 and -1.5 (Tabachnick & Fidell, 2013). The frequency, arithmetic mean, and standard deviation of the items in the scale were calculated. In addition, since the data were parametric, a t-test for two variables and a one-way analysis of variance (ANOVA) for more than two variables were used. The level of significance was determined as ".05". The LSD test was also performed to reveal the source of the difference between the groups.

A Pearson Product Moments Correlation Coefficient (r) analysis was performed to investigate the relationship between participants' perceptions of 21st century skill proficiency and their digital literacy levels. This analysis is used to determine the level of linear relationship between 2 continuous variables. The correlation coefficient takes values from +1 (perfect positive linear relationship) to –1 (perfect negative linear relationship), a value of zero points to no relationship (Köklü,Büyüköztürk & Çokluk-Bökeoğlu,2018).

Simple linear regression was used to investigate the level of effect between the participants' perceptions of 21st century skills proficiency and digital literacy levels. Regression analysis refers to the explanation of the relationship between dependent and independent variables that have a relationship with each other (Büyüköztürk, 2018).

## FINDINGS

The descriptive statistics of the 21st Century Skills and Competences Scale and the Digital Literacy Scale are presented in Table 4.

**Table 4.** *The descriptive statistics of the 21st century skills and competences scale and the digital literacy scale*

| | n | $\bar{X}$ | sd |
|---|---|---|---|
| 21st Century Skills and Competences Scale | 283 | 4.20 | .40 |
| Learning and Innovation Skills | 283 | 4.15 | .48 |
| Life and Career Skills | 283 | 4.23 | .41 |
| Information, Media and Technology Skills | 283 | 4.23 | .48 |
| Digital Literacy Scale | 283 | 4.15 | .46 |
| Attitude | 283 | 4.23 | .54 |
| Technical | 283 | 4.06 | .72 |
| Cognitive | 283 | 4.22 | .60 |
| Social-emotional | 283 | 3.87 | .82 |

The values in Table 4 showed that participants had higher levels of 21st century skills proficiency ($\bar{X}$= 4.20) and digital literacy ($\bar{X}$= 4.15). In the 21st Century Skills and Competences Scale, the participants were

found to have high levels of "Learning and Innovation Skills" ($\bar{X}$= 4.15), very high levels of "Life and Career Skills" ($\bar{X}$= 4.23) and Information, Media and Technology Skills (($\bar{X}$= 4.23). In addition, on the Digital Literacy Scale, they had high levels of Technical ($\bar{X}$= 4.06) and Social-emotional ($\bar{X}$= 3.87) and very high levels of Attitude ($\bar{X}$= 4.23) and Cognitive ($\bar{X}$= 4.22).

The t-test results of the participants' perceptions of 21st century skill proficiency and their views on digital literacy with regard to gender are presented in Table 5.

**Table 5.** *The t-test results with regard to gender*

| | **Gender** | **N** | $\bar{X}$ | **sd** | **t** | **p.** |
|---|---|---|---|---|---|---|
| 21st Century Skills and Competences Scale | Female | 145 | 4.19 | .39 | -.527 | .599 |
| | Male | 138 | 4.21 | .42 | | |
| Learning and Innovation Skills | Female | 145 | 4.11 | .48 | -1.42 | .154 |
| | Male | 138 | 4.20 | .48 | | |
| Life and Career Skills | Female | 145 | 4.24 | .40 | -.386 | .700 |
| | Male | 138 | 4.22 | .43 | | |
| Information, Media and Technology Skills | Female | 145 | 4.23 | .49 | -.203 | .840 |
| | Male | 138 | 4.24 | .48 | | |
| Digital Literacy Scale | Female | 145 | 4.07 | .52 | -2.96 | .003* |
| | Male | 138 | 4.23 | .39 | | |
| Attitude | Female | 145 | 4.20 | .55 | -1.90 | .058 |
| | Male | 138 | 4.31 | .41 | | |
| Technical | Female | 145 | 3.97 | .61 | -3.73 | .000* |
| | Male | 138 | 4.21 | .47 | | |
| Cognitive | Female | 145 | 4.24 | .56 | .082 | .935 |
| | Male | 238 | 4.25 | .53 | | |
| Social-emotional | Female | 145 | 3.77 | .81 | -1.90 | .006* |
| | Male | 238 | 4.03 | .72 | | |

*p<.05

As shown in Table 5, there was no significant difference in the 21st century skills proficiency perceptions of classroom teachers (t=-.527; p=.599>.05) and its dimensions with regard to gender. Similarly, a significant difference was not found in the Attitude (t(281) =-1,90;p=,058>.05) and Cognitive (t(281)=,082;p =,935>.05) dimensions of the Digital Literacy Scale. However, it was found that male participants had higher scores than female participants in the Attitude and Cognitive dimensions.

On the other hand, there was a significant difference in the total Digital Literacy Scale (t(281)=-2.96; p=.003<.05) and its Technical (t(281)=-3.73; p=.000<.05), and Social-emotional (t(281)=-2.79; p=.006<.05) dimensions. It was found that the male participants had significantly higher scores on the total Digital Literacy Scale and its Technical and Social-emotional dimensions.

ANOVA results of the participants' perceptions of 21st century skills proficiency and their views on digital literacy with regard to work experience are shown in Table 6.

**Table 6.** *ANOVA Results with regard to work experience*

| | Work Experience | N | $\bar{X}$ | ss | F | p |
|---|---|---|---|---|---|---|
| 21st Century Skills and Competences Scale | 1-5 years | 28 | 4.23 | .43 | .448 | .719 |
| | 6-10 years | 35 | 4.26 | .43 | | |
| | 11-15 years | 47 | 4.16 | .38 | | |
| | 16 and above | 173 | 4.20 | .40 | | |
| | Total | 283 | 4.20 | .40 | | |
| Digital Literacy Scale | 1-5 years | 28 | 4.14 | .53 | 1.455 | .227 |
| | 6-10 years | 35 | 4.28 | .44 | | |
| | 11-15 years | 47 | 4.20 | .52 | | |
| | 16 and above | 173 | 4.11 | .44 | | |
| | Total | 283 | 4.15 | .46 | | |

ANOVA results revealed that there was no significant difference in 21st century skills and competences or digital literacy levels among the participants in terms of work experience. The examination of the average scores in the 21st century skills learning and renewal skills sub-dimension revealed that the participants with 1-5 years of work experience ($\bar{X}$=4.20) had the highest average and those with 11-15 years of work experience ($\bar{X}$=4.08) had the lowest average. It was also found that the participants with 6-10 years of work experience had the highest average, and those with 11-15 years of work experience had the lowest average in the life and career skills and Information, media and technology skills subdimensions. The examination of the average scores of digital literacy levels according to work experience showed that the participants with 6-10 years of work experience had the highest average, while those with 16 years and above had the lowest average.

A correlation analysis was performed to investigate the relationship between the participants' digital literacy levels and 21st century skills. The correlation results are shown in Table 7.

**Table 7.** *Correlation analysis results*

| Variables | 1 | 2 | 3 | 4. | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| 1.21st Century Skills and Competences Scale | 1 | | | | | | | | |
| 2.Learning and Innovation Skills | ,920** | 1 | | | | | | | |
| 3.Life and Career Skills | ,925** | ,751** | 1 | | | | | | |
| 4. Information, Media and Technology Skills | ,781** | ,600** | ,643** | 1 | | | | | |
| 5.Digital Literacy Scale | ,589** | ,571** | ,480** | ,525** | 1 | | | | |
| 6. Attitude | ,482** | ,441** | ,406** | ,456** | ,852** | 1 | | | |
| 7. Technical | ,556** | ,563** | ,439** | ,473** | ,879** | ,547** | 1 | | |
| 8. Cognitive | ,439** | ,392** | ,419** | ,340** | ,733** | ,627** | ,532** | 1 | |
| 9.Social-emotional | ,431** | ,446** | ,308** | ,410** | ,805** | ,524** | ,737** | ,505** | 1 |

As shown in Table 7, there was a moderate, significant, and positive relationship between the participants' perceptions of 21st century skills proficiency and digital literacy levels (r=.589; p<0.01). As the participants' 21st century skills and competency perceptions increased, their digital literacy levels also increased. A low, significant and positive relationship was found between the Life and Career Skills dimension of the 21st Century Skills and Competences Scale and the Social dimension of the Digital Literacy Scale (r=.308; p<0.01). Similarly, there was a moderate, significant, and positive relationship between Learning and Innovation Skills dimension of the 21st Century Skills and Competences Scale and Technical dimension of the

Digital Literacy Scale (r=,563; p<0.01).

A regression analysis was carried out in order to examine the level of relationship between the participants' digital literacy levels and 21st century skills. The results of the regression analysis are presented in Table 8.

***Table 8.*** *Regression analysis results*

| Dependent Variable | Independent Variable | β | Standard Error | Beta | t | p | F | R2 |
|---|---|---|---|---|---|---|---|---|
| **Digital Literacy** | Constants | | | 1.313 | | | 149.114 | 0.344 |
| | 21st Century Skills and Competences | 1.313 | 0.234 | | 5.615 | 0.000* | | |

The F value in the regression analysis revealed that the model was statistically significant (F=149.114; p<0.05). In addition, the beta coefficient value, t value, and significance level of the independent showed that 21st century skills had a statistically significant effect on digital literacy (t=5.615, p<0.05). A 1-unit increase in 21st Century Skills and Competences led to a 1.313 increase in digital literacy (β=1.313). Finally, it was found that 21st Century Skills and Competences explained 34% of the change in digital literacy.

## DISCUSSION AND CONCLUSION

Individuals born and living in the 21st century should be prepared for future conditions. In this process, primary school teachers, who are responsible for the education of the students and who guide and lead the education of the students, have significant responsibilities. Hence, this study tried to investigate the 21st century proficiency and digital literacy levels of primary school teachers. Gelmez Burakgazi et al. (2019), Nuangchalerm (2017), Aktaş (2022) reported that pre-service teachers had high proficiency in 21st century skills. The findings revealed that the participants had a high level of proficiency perceptions of 21st century skills. In line with this finding, Yalçın İncik (2020), Eğmir and Çengelci (2020), Uyar and Çiçek (2021) reported that teachers had high levels of 21st century skills. This indicated that primary school teachers were aware of the importance of integrating technology into teaching in the 21st century (Pa-alisbo, 2017). In addition, it may be argued that primary school teachers are able to use the evolving technology actively and correctly, try to solve problems by thinking creatively, and improve themselves by adapting to the age they live in (Çelebi, Sevinç, 2019).

The participants' 21st century skills and competences were examined with regard to gender, and no significant difference was found. This result indicated that the participants' 21st century skills competencies did not change by gender. Similarly, in studies conducted with pre-service and in-service teachers, 21st century competencies and skills were examined with regard to gender, and it was found that there was no significant difference (Korkmaz 2019; Kıyasoğlu 2019; Çelebi & Sevinç,2019; Eğmir & Çengelci,2020; Özden, Tayşi, Şahin , Kaya & Bayram,2018; Başar,2018; Haviz, Maris, Adripen, Lufri, David & Fudholi, 2020; Gonzales,2020). On the other hand, Bahrain (2021) and Göksun Orhan (2016) reported a significant difference in terms of gender in favor of female participants. The reasons for this finding may be that female teachers use technology more effectively in education; they use learning activities including analysis and synthesis elements, which are considered more complex learning (Erdemir, Bakırcı & Eyduran, 2009); and they have higher levels of pedagogical content knowledge and content knowledge (Lin, Tsai, Chai & Lee, 2012).

21st century skills were also investigated with regard to work experience, and as a result, it was found that there was no significant difference. Similar to the present study, Kıyasoğlu (2019) examined the 21st century learner and teacher skills of primary school teachers and reported that there was no significant

difference in terms of work experience. Varghese and Musthafa (2021) stated in their study that there was a positive relationship between work experience and 21st century skills perceptions. This may suggest that teachers' 21st century skills perceptions do not change according to their age and experience, and that they adapt to the required skills and use them in education.

The examination of the digital literacy levels of the participants showed that their digital literacy levels were high. Anisimova (2020) investigated the digital literacy levels of the pre-service teachers and stated that their digital literacy levels were high. These findings indicate that teachers improved themselves in order to keep up with the changing and emerging technology and the education systems to follow the developments strictly due to the fact that they work with the new generation, who can adapt to the age rapidly and can distinguish the accuracy and inaccuracy of the information obtained through technology.

This study showed that the digital literacy levels of the participants differed significantly by gender, favoring of male participants. Similarly, Baterna, Mina, and Rogayan Jr (2020), Sivrikaya (2020), Ocak and Karakuş (2018), Özoğlu (2019), Sulak (2019), and Pagani, Argentin, Gui, and Stanca (2016) found that high school students' digital literacy differed significantly in favor of male participants. The fact that men follow technological developments more than women may be one of the reasons for this finding. Kozan and Özek Bulut (2019) investigated the digital literacy levels of pre-service teachers and found that there was no significant difference with regard to gender.

It was also found that the digital literacy levels of the participants did not differ by work experience. Arslan (2019) examined the digital literacy of in-service teachers and found that teachers with 21 and more years of experience had a lower mean score than those with 1-4 and 5-9 years of experience. This finding was explained by the fact that young teachers spend most of their lives intertwined with technology.

The relationship between the participants' perceptions of 21st century skills proficiency and their digital literacy levels was examined, and it was found that there was a moderate, positive, and significant relationship. The digital literacy levels of the participants increased with their perception of 21st century skills proficiency. The fact that 21st century skills are intertwined with technology, adaptable to changing and developing times, open to innovations, and include skills such as media literacy can be considered the reasons for the moderate, positive, and significant relationship between digital literacy and 21st century skills. In addition, Önür and Kozikoğlu (2020) investigated the relationship between elementary school students' 21st century learner skills and educational technology competencies, and reported a positive and significant relationship. The finding was explained by an increasing level of education.

It was reported in this study that the participants' perceptions of 21st century skill proficiency significantly predicted their digital literacy levels. The reason for this finding may be that digital literacy is dynamic and constantly developing, which, in turn, requires learning and constant renewal of existing information. Eğmir and Çengelci (2020) examined whether teachers' 21st century skills predicted their reflective thinking. They found that 21st century teacher skills significantly predicted reflective thinking practice skills. It was reported that administrative skills predicted the skills of applying reflective thinking at the highest level. Similarly, Eğmir and Erdem (2021) examined whether pre-service teachers' teacher identities predicted their 21st century learner skills during their undergraduate education. It was found that pre-service teachers' teacher identities significantly and strongly predicted 21st century learner skills. Woods-Groves, Choi, and Balint-Langel (2021) investigated teachers' judgments about students' 21st century skills and academic and behavioral outcomes and the relationship between them. As a result, they reported a predictive relationship between teachers and students' perceptions of 21st century skills and student achievements.

### Suggestions

In-service seminars and trainings can be provided by universities and the ministry of education to increase primary school teachers' perceptions of 21st century skills proficiency and digital literacy levels, and thus individuals having skills required for the information age can be trained. It was stated that the digital literacy levels of the primary school teachers differed by work experience. Intensive training on the use of technological devices can be offered to teachers with more years of work experience. In the period of information explosion and access, issues such as the ways for individuals to distinguish accurate information from information pollution, using digital tools, and protection are of great importance. For this reason, more attention should be paid to improving the skills of teachers who guide students.

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