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# Using digital differentiation to improve EFL achievement and self-regulation of tertiary learners: the Turkish context

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## ABSTRACT

**Purpose:** The current study examines the impact of Differentiated Instruction (DI) on students' EFL speaking proficiency and Self-Regulated Learning (SRL) during online learning at a Turkish higher education institution's English preparatory program.

**Design/methodology/approach:** Carried out as a sequential explanatory mixed-methods approach, this quasi-experimental study first collected quantitative data from two intact classrooms, experimental group ( $n = 16$ ), control group ( $n = 15$ ), through a speaking proficiency test and the Turkish translation of a Likert-type Online Self-Regulation Questionnaire (OSRLQ) as pre-/post-test; and qualitative data through a semi-structured focus group interview with six students. The qualitative data were coded and interpreted through content analysis.

**Findings:** Based on Tomlinson's (2001) DI framework, the intervention plan of this study involved differentiating the process, product and learning environment of the online learners based on their readiness levels and interests. The results revealed that the DI-group improved its speaking significantly higher than the non-DI group whereas the overall SRL of the both groups did not differ meaningfully. The DI-group improved its help-seeking strategy use significantly. The analysis of qualitative data indicated that the students held positive views of online practices used for DI purposes such as formative assessment, differentiated speaking tasks while questioning group work arrangements. The participants also stated that they improved their use of target setting, help seeking and self-assessment.

**Originality/value:** This study contributes to the literature in providing insight into the effects of differentiation practices during online learning and suggests implications for designing innovative differentiated EFL learning experiences during remote learning.

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## KEYWORDS

Differentiated instruction; online education; self-regulated learning; speaking; EFL

## Introduction

Following a quick shift to online learning in the wake of the Covid-19 outbreak, an emergency approach has been replaced by more carefully devised action plans in education. With a comprehensive roadmap it offers to practitioners, digital differentiated instruction (DI) has become an intriguing question for teachers and researchers with increasingly more studies exploring the effectiveness of virtual differentiation as an instructional approach (Abid et al. 2021; Beck and Beasley 2021; Güvenç 2021; Idrus, Asri, and Baharom 2021; Romero-Ivanova et al. 2020). According to Morgan (2014), it's essential to use information and communication technologies (ICT) in the implementation of DI

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on the digital natives of the twenty-first century. Given the realities of today when educators find themselves more and more in need for technology integration into instruction, Tomlinson's (2001) DI framework has been reinterpreted to serve as a roadmap for effective online practices that pave the way for successful student outcomes in remote learning.

Additionally, online learning experiences encourage students to become more self-regulated, or autonomous (Alioon and Delialioğlu 2019) as students exert a greater control over their studying situation (Barnard et al. 2009). However; use of technology alone does not necessarily enhance learners' self-regulation as meticulous lesson planning and selection of appropriate digital tools as well as utilizing robust pedagogy are essential (Bond et al. 2020). One method to foster learner autonomy in online environments is to design lessons based on students' individual differences, particular needs and communicating high expectations (McFarlane 2012). As illustrated in previous research, DI offers a potential to improve learner autonomy through the use of educational technologies (Gülşen and Mede 2018; Güvenç 2021; Leblebici 2020).

Overall, whereas abundant research reported the benefits of using DI in traditional brick and mortar classrooms, there is a gap in the literature regarding remote applications of differentiation and more studies are needed to provide guidance for the practitioners and policy makers to determine how DI may work in virtual learning (Beck and Beasley 2021). Hence this study aims to explore the effect of DI on the students' EFL achievement in terms of speaking proficiency and SRL in an intact classroom at a private, non-profit foundation university from Turkey.

## Literature review

### *Differentiated instruction (DI)*

There are several definitions of DI in the literature in recent decades. For instance, according to Hall (2002), DI is a teaching and learning approach that acknowledges the diverse background knowledge, readiness levels and interests of students and responds to these differences. The key terms in his conceptualization include assessment for learning, focusing on key concepts and critical thinking, student engagement and balancing teacher-assigned and student-selected tasks. Roy, Guay, and Valois (2013) predicated DI involves two major considerations: academic progress tracking, which demonstrates diverse students' abilities, and adaptations to instruction, which include varying content, process and product. Gheysens et al. (2020) views DI as a pedagogical model and a teaching philosophy with its set of teaching practices.

Due to its practical nature, this study utilized a prevailing DI conceptualization by Tomlinson (2001), whose model offers classroom practices and approaches to varying student needs. Tomlinson (2001) suggested that four aspects of a lesson can be differentiated: content (what we teach), process (how we teach it), and product (how we assess the learning) and learning environment. These aspects of the lessons can be differentiated depending on the students' varying readiness or proficiency levels, interests or learning style preferences. This model comes with a wide variety of strategies to be employed in the classroom, yet within the scope of this study, DI was mostly based on students' readiness levels and implemented during the selection of the suitable content in some classes and in the process of the lesson. As prominent differentiation tools, group work may be utilized flexibly which allows students to work in matched or mixed ability groups, tiered tasks and assignments may be used to present students with appropriately challenging tasks and three types of assessment (pre-, formative and summative assessment) may be used to support learning (Tomlinson 2001).

### *DI in online education*

The past decade witnessed a growing body of literature regarding the effect of DI on student achievement in tertiary EFL contexts reporting the improvement caused by differentiation in the areas of grammar, vocabulary, reading and writing (Siddiqui and Alghamdi 2017; Paredes 2017;

Leblebici [2020](#)). Other studies in different grade levels also demonstrated that DI provided an effective instructional design to improve student achievement in EFL and other subjects (for example: Reis et al. [2011](#); Magableh and Abdullah [2020](#); Chamberlin and Powers [2010](#); Pablico, Diack, and Lawson [2017](#)). However, fewer studies have thus far explored the DI practices in online education.

Beck and Beasley ([2021](#)) interviewed a total of 92 online classroom teachers from three schools in the US in order to find out about their differentiation practices. The results showed that the majority of these teachers lacked expertise in virtual DI and there is a need for further studies to explore best virtual DI practices and guide professional development of online teachers. In a qualitative phenomenological study conducted with eleven faculty members in a Pakistani higher education institution, Abid et al. ([2021](#)) found that DI practices were frequently mentioned as a factor that made online learning efficient by the participants. Güvenç ([2021](#)) conducted an action research to explore the perceptions of DI on an instructor and twelve students during an online EFL course in a Turkish higher education institution. The results demonstrated that the students mentioned entertaining, engaging, cooperative and effective qualities of DI practices while the instructor observed they enhanced students' autonomy and raised time-related problems.

In another study examining the practitioners' perspectives of DI implementations in online teaching, Idrus, Asri, and Baharom ([2021](#)) interviewed six English language teachers from three Malaysian schools and collected their reflections. The results revealed that the teachers believed DI was worthwhile in traditional classrooms, however; it was quite challenging during the online learning due to students' and parents' attitudes, lack of training and other concerns including lack of time and effort to design differentiated lesson plans. Romero-Ivanova et al. ([2020](#)) reviewed the reflections of a university professor and their pre-service teacher students from a US university with online instruction practices. It was concluded that the emergency shift to online teaching presented opportunities to raise practitioners' awareness of digital technologies and how to adapt teaching to online environments. Differentiation could also be achieved during remote teaching through a wise use of ICT tools such as Zoom breakout rooms and a video response platform, Flipgrid.

For the purposes of this study, DI was compared with traditional instruction, which can be defined as mostly teacher-fronted and whole class, leaving little room to cater for individual differences, and students remain more passive with little opportunities for problem solution and experimenting with the content (Halici Page and Mede [2018](#)). The changes in the speaking proficiency and SRL of the DI-group was measured against the non-DI group who received traditional instruction.

## Methodology

### Research questions

This study aims to examine the impact of DI on students' speaking proficiency and SRL in an online EFL module and seeks to explore students' opinions of their experiences with DI. Therefore, the following research questions are addressed:

- (1) Will there be a difference between the DI and non-DI groups in terms of their speaking proficiency following the treatment with DI?
- (2) Will there be any differences in the SRL of the students overall and as per the following subscales:
  - (a) environment structuring
  - (b) goal setting
  - (c) time management
  - (d) help seeking
  - (e) task strategies
  - (f) self-evaluation
- (3) What are the students' perceptions of receiving DI during their EFL course?

### **Study design**

In order to answer the research questions, this study adapted a sequential explanatory mixed methods design in which qualitative data collection follows quantitative data collection aiming to explain the quantitative results and gain a deeper understanding of the research questions (Ivanova, Creswell, and Stick 2006). The quantitative data were collected using a speaking test and Turkish OSRLQ whereas the qualitative data were gathered in a semi-structured focus group interview with students from the experimental group.

### **Setting and sample**

The study was carried out at a foundation (non-profit, private) university's English preparatory program with over 300 students in Turkey. All the students were required to successfully get through the upper intermediate/B1 + level or pass the proficiency test following the intermediate/B1 level to become eligible for their departments, which were 30 percent medium of English. The students in the preparatory school mostly take the placement test before they start the program to determine their level and classes, however; the experimental and control groups consisted of students who did not take the placement test and randomly grouped together in their A1 classes. The class size ranged from 15 to 18 students for the A1 level when this study took place. At the time of the study, the school was delivering all EFL courses synchronously on Zoom and using Google Classroom as its learning management system.

Regarding the sample population, the participants were selected from two intact A1 classes and there was no information about the students' prior EFL knowledge since they had not taken the placement test. The DI-group was delivered an intense program of differentiation by the researcher for 12 hours a week whereas the remaining 12 hours the class received traditional instruction. The non-DI group received traditional instruction with occasional group work and gamified formative assessment activities.

The sample differed extensively in terms of the formal English instruction they had earlier received. A total of five students reported they started learning English at the preparatory program while others had earlier starts stretching from pre-school to high school.

As for their online learning experiences, the participants varied in the length of receiving distance education. The majority reported that they had only two weeks of online classes, which meant they started learning remotely at the preparatory program, (for experimental group:  $n = 8$ , 50%; for control group:  $n = 11$ , 73.3%). The remainder of the students received online education for three to 12 months prior to the DI treatment.

### **Ethical conduct**

This research was launched following the approval of the higher education institution where this study took place. Since the data collection was conducted during the lockdown, the participants were orally informed about the study and ensured that they could drop out at any point they wished without any penalization. Before responding to the pre- and post-tests for Turkish version of OSRLQ, they were reminded of their rights to opt out on the Google Forms they received links to. The institution did not require the researchers to collect written approval of the participants.

### **Procedures**

#### **Data collection instruments**

Multiple data collection instruments were integrated for triangulation purposes. Quantitative data to assess students' speaking proficiency were gathered using a speaking test using the format that the preparatory school has been using over a decade to grade the speaking proficiency of its students.

The questions were adapted from the course book unit objectives, which was Empower by Cambridge University Press. The same test was used for the pre- and post-test. The scores were determined based on an analytical rubric by Marek and Wu (2011) by two raters. The rubric consisted of five parts which are content, vocabulary, grammar, pronunciation and fluency.

Secondly, the SRL of the students were evaluated using a self-report instrument, Turkish OSRLQ, which was translated and piloted by Kilis and Yildirim (2018) from the original measure developed by Barnard et al. (2009). The Turkish OSRLQ was found to have acceptable validity and good fit with a  $\chi^2/df$  ratio value of 2.45. As for reliability, the overall Cronbach Alpha value for the entire questionnaire was .95. Due to the situational restrictions in this study, two minor changes were applied on the questionnaire. A part in item 16 which stated the students did not have attendance requirements was removed since the participants had to follow at least 70 percent of the classes and in item 19, the statement concerning arrangement of face-to-face meetings with classmates was changed into communicating with the classmates due to the Covid-19 lockdown. The Cronbach Alpha for the entire questionnaire in this study was found to be .87, which is close to showing excellent reliability (Perry Hinton et al. 2004).

Thirdly, a semi-structured focus group interview was conducted at the end of the DI treatment through purposeful sampling. The students who showed the greatest and lowest improvement in their speaking proficiency joined the interview voluntarily to reflect on the EFL module. Five interview questions were formed following a discussion with an English Language Teaching (ELT) professor to understand students' DI experiences. The questions examined the students' perceptions of DI strategies (formative assessment, grouping arrangements and differentiated assignments) and how the module helped them with their self-regulation.

### ***Interrater reliability***

The agreement of rater for the speaking test was calculated using Intraclass Correlation Coefficient (ICC) in SPSS version 22 as it is reported to be a more ideal measure to demonstrate the extent to which raters are in agreement and their scores are correlated (Koo and Li 2016). ICC estimates, calculated using SPSS version 22 based on two-way mixed-effects model, revealed that the interrater reliability was in place for both pre- and post-test scores with values over 0.9, which is indicative of excellent reliability (Koo and Li 2016).

### ***Data analysis***

The quantitative computations were carried out in SPSS version 22. After normal and homogeneous distribution of the data was confirmed using Levene's test and skewness and kurtosis values, t-tests were computed to compare within and between-group differences. Due to a significant difference between the pre-test scores of the DI and non-DI groups, an analysis of covariance (ANCOVA) test was computed for a more accurate comparison of the post-test scores of the two groups and rule out the effect of pre-test scores.

As for the qualitative data, content analysis was conducted on the verbatim transcription of the semi-structured focus group interview. In order to establish trustworthiness of the findings and ensure a high standard for coding, interrater reliability was pursued with percentage agreement. Based on a scheme offered by O'Connor and Joffe (2020), the researcher selected about 25 percent of the data (representative of the entire data set) in separate units to be coded. Following two rounds of discussions, the initial percentage of agreement which was .74 rose to .96. The rest of the data was coded by the researcher.

### ***Implementation***

The research procedures took a total of nine weeks. Lessons were differentiated to facilitate students to achieve course objectives. The data collection procedures and the details of the online implementation of DI during the intervention weeks are as follows:

*Week 1 and 2:* During these weeks, the teacher collected data mainly concerning the proficiency levels of the students and took extensive notes about any DI-relevant information such as their interests and attitudes towards learning English. Pre-assessment tasks were frequently conducted on goformative.com to gather data on the students' readiness and obtain information about the patterns in the classroom as a preparation for purposeful group work activities. Short one-to-one meetings were held to get the students' emotional temperature after the classes on Zoom. One-to-one speaking proficiency tests and Turkish translation of OSRLQ were also administered during these weeks.

*Week 3:* This week the intervention period started. The teacher used her notes and the results on goformative.com to determine the ability groups. In their matched groups, the class worked on tasks suited to their level on Google Docs and goformative.com in the Zoom breakout rooms. The struggling students received small group instruction twice to establish the basics of English grammar in the main room while their friends were working in the breakout rooms. They also completed two speaking assignments by recording their voice individually on the goformative.com and received individualized written and audio feedback. Two speaking clubs were held on Zoom: one for stronger group and another for weaker group.

*Week 4:* In this second week of intervention, the students were purposefully grouped together based on their readiness levels twice and once based on their interests. They worked on their respective Google Docs where they had their tiered tasks in the Zoom breakout rooms. They also completed two formative speaking assignments during the class time and recorded their voices on goformative.com and received individualized feedback. The speaking clubs were held once for each matched-ability group.

*Week 5:* It was a short week due to a national holiday. The students received formative assessment on goformative.com for the teacher to monitor their proficiency levels and progress. Based on the results, the students worked on their separate tasks on Google Docs in their breakout rooms whereas the group that showed lack of understanding and production in the basic structures stayed with the teacher in the main session for small group instruction. This week the class received their speaking assignments to practice that week's lesson objectives and the speaking clubs were also held.

*Week 6:* This week the students studied their tiered tasks in their matched-ability groups in Zoom breakout rooms based on their performance in the formative assessment and the teacher's observations twice. Google Docs was used to introduce the tiered tasks. They had three speaking assignments on goformative.com where the teacher also sent them individualized feedback. The speaking clubs also took place this week.

*Week 7:* In the final week of the DI intervention, the students worked on their tiered tasks on Google Docs in their Zoom breakout rooms during four days. They also received formative speaking assignments on goformative.com and attended the speaking clubs on Zoom.

*Week 8 and 9:* During these two weeks, which also marked the end of the teaching module and the week that followed, the researcher gave the one-to-one speaking proficiency tests and the Turkish translation of OSRLQ. In Week 9, based on the results in the speaking tests, the students selected through purposeful sampling were invited and joined the focus-group interview.

## Findings

### *Changes in the speaking proficiency of the DI and non-DI groups*

An ANCOVA test was run in order to view the difference between the experimental and control groups and see the effect of DI treatment on the post-test results by adjusting for the pre-test scores.

It is clearly demonstrated in [Table 1](#) that the mean of the post-test scores of the DI-group is significantly higher than the non-DI group [ $F(1,28) = 8.047, p = .008$ ] whilst adjusting for the pre-test.

**Table 1.** ANCOVA-adjusted speaking post-test differences.

Source	Dependent Variable: Post Speaking					
	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	351.636 <sup>a</sup>	2	175.818	33.661	.000	.706
Intercept	225.932	1	225.932	43.255	.000	.607
Pre Speaking	346.759	1	346.759	66.388	.000	.703
Group	42.030	1	42.030	8.047	.008	.223
Error	146.251	28	5.223			
Total	8227.250	31				
Corrected Total	497.887	30				

<sup>a</sup>R Squared = .706 (Adjusted R Squared = .685).

Besides, a large effect size was estimated by the partial eta squared value as values equal to or larger than .14 indicate a large effect size (Sink & Stroh, 2006).

Additionally, a paired samples t-test showed both groups improved their speaking proficiency at a significant level (DI-group  $p$  value = .00 < .05, non-DI group  $p$  value = .01 < .05).

### Changes in the participants' SRL

An independent samples t-test revealed that groups did not differ in terms of their overall SRL scores before and after the DI treatment. The students in both the experimental and the control group reported a similar level of self-regulatory strategy use as there is not a statistically significant difference between their pre-test ( $p = .394 > .05$ ) or post-test ( $p = .908 > .05$ ) scores as well the difference between the two pre- and post-tests ( $p = .234 > .05$ ).

The within-group statistics obtained through a paired samples t-test showed the groups did not significantly change their overall SRL as the  $p$ -value was higher than .05 for both groups (experimental group = .67 and control group = .24).

As for the SRL subscales, an independent samples t-test revealed the groups did not significantly differ from each other in any of the subscales whereas the control group did not display any changes in the subscales according to a paired samples t-test.

The only change, however, was detected in the experimental group through a paired samples t-test in two subscales: help-seeking and time management. Table 2 demonstrates the changes below.

As can be seen in the table, the experimental group reported using help seeking strategies significantly more at the end of the online module, yet the positive change in the control group was minor. On the other hand, both groups reported lower use of time management strategies whereas it was a significant lower point for the experimental group.

### Student perceptions of DI

Five main themes signposted the opinions of the students on the DI treatment. The participants from the DI-group mostly uttered positive experiences whilst they also articulated their doubts regarding the effectiveness of grouping strategies.

**Table 2.** Paired samples t-test comparing changes in time management and help seeking.

	Group		t	df	Sig. (2-tailed)
	Pair 1	Pair 2			
Experimental	postTM - preTM		-3,845	15	,002
	postHS - preHS		2,174	15	,046
Control	postTM - preTM		-1,009	14	,330
	postHS - preHS		,889	14	,389

### ***Maximized learning experiences***

A common idea through the interview was maximized learning experiences as the students felt more empowered compared to their peers and more confident to use the language.

[...] I can form sentences now. I couldn't communicate my opinions in English. But now I think I developed myself a lot. You need to push your limits to speak English. I think I developed my speaking because I challenged myself in the speaking clubs. I feel that overall the lessons were more efficient. (Focus Group Interview, S8)

[...] Compared to my friends in other Prep Schools, I'm clearly better. They cannot make any sentences and follow the lessons. We review the topics we don't understand and our teacher makes sure everybody gets it. (Focus Group Interview, S8)

[...] Before this module, I could understand what I heard but I couldn't speak. I can, now. (Focus Group Interview, S10)

### ***Formative assessment and individualized feedback***

Another major theme was formative assessment and individualized feedback that the students received in their speaking tasks. During the implementation, the students received formative tasks on a formative assessment platform for speaking practice and got timely feedback suited to their needs from their teacher.

[...] It was great to see what we were lacking. I have never worked that hard to fix my mistakes. (Focus Group Interview, S16)

[...] We needed it during and after the class to practice and see our mistakes. ... Before every exam, I took a look at the feedback I got. (Focus Group Interview, S12)

[...] I couldn't really understand what I didn't get and what I lacked during the instruction. Formative exercises made me notice these. (Focus Group Interview, S1)

[...] It was useful especially for pronunciation. (Focus Group Interview, S12)

[...] It was helpful because you pointed out to our pronunciation mistakes. (Focus Group Interview, S16)

### ***Promotion of goal setting***

The students' accounts also revealed that regular use of formative assessment and other classroom routines played an integral part in establishing goals. Seeing their shortcomings during the formative tasks pushed them to study further.

[...] Formative exercises and speaking clubs helped me direct my efforts. (Focus Group Interview, S1)

[...] The online exercises absolutely helped me study more efficiently. Even though I was overwhelmed towards the end, I kept going. (Focus Group Interview, S10)

[...] This module was far better than I imagined. I thought we would be passive but I tried hard to achieve further. (Focus Group Interview, S12)

[...] I think the formative exercises affected my studying a lot. I would sit in front of the screen for hours to fix my mistakes there. (Focus Group Interview, S16)

### ***Promotion of self-evaluation and help seeking***

The differentiation strategies such as formative assessment and purposeful grouping also helped students assess their own progress and reach out to receive social help if the need be.

[...] I learned a lot of new words and how to speak fluently from my friends. I also got in touch with the teacher if I had any questions. (Focus Group Interview, S1)

[...] Whenever I noticed a gap in my knowledge in grammar, I'd go ask one of my friends. (Focus Group Interview, S10)

[...] I'd compare my friends' studying habits with mine and try to adapt some of the strategies they used. (Focus Group Interview, S10)

### ***Positive and negative group dynamics***

The students also voiced doubts regarding the effectiveness of the group work. Whereas they found it useful at times, at others the group activities did not work as smoothly as they hoped.

[...] The groups made sense because the teacher knew the class. They helped us socialize and meet new people. I always found a way to make them work for me. (Focus Group Interview, S10)

[...] I learned a lot from my friends during the group work. (Focus Group Interview, S1)

[...] The group work was still good, especially when I was with my close friends. (Focus Group Interview, S16)

[...] Sometimes it didn't matter what you did. When the other person wasn't willing to work, it didn't work out well. (Focus Group Interview, S3)

## **Discussion and conclusions**

### ***The difference between speaking proficiency of DI and non-DI groups***

The results showed that both groups improved their speaking proficiency at the end of the module while the experimental group showed a significantly greater improvement. The development of the DI-group may be a consequence of student-centered instruction delivered in line with Tomlinson's DI framework. In other words, the learners in the DI classroom received tailored instruction that responded to their needs. Earlier studies demonstrated that EFL students respond positively to DI strategies such as formative assessment, varying levels of teacher and peer scaffolding, and flexible use of grouping strategies to improve their foreign language achievement (Paredes 2017; Siddiqui and Alghamdi 2017; Leblebici 2020; Magableh and Abdullah 2020).

Besides, technology-enhanced DI may lead to a significantly higher increase in the experimental group. This finding is supported in several studies which made use of digital tools for differentiation purposes in different age groups and subjects (Güzel and Aydin 2016; Buckingham and Alpaslan 2017; Faber, Luyten, and Visscher 2017; Gülşen and Mede 2018; Ontaneda Rea 2019). This study contributed to the literature in providing empirical evidence in favor of innovative online DI practices.

Regarding the four dimensions in Tomlinson's DI model, the use of DI strategies to differentiate the process, product, and learning environment contributed to the post-test performance of the experimental group. It can be argued that varied types of activities to differentiate the process had the greatest impact on this particular outcome. During the DI intervention, the process of learning was often differentiated through need and interest-based series of activities to facilitate student understanding. Students received varied amounts of scaffolding in the process, or 'sense-making' (Tomlinson 2001, 79) stage of the lesson, and were challenged based on their readiness levels through strategies such as formative assessment, tiered tasks or small group teaching. Having ample opportunities to personalize the learned content through differentiation of the process plausibly explains the increase in the DI group's EFL speaking achievement. Therefore, further studies are needed to demonstrate the effect of process-based differentiation on student attainment in online learning.

### ***The differences in students' SRL***

The statistical analysis revealed that the participants did not change their overall SRL use during their online English classes whereas there was a significant improvement in the perceived use of help

seeking strategies in the experimental group. The lack of change in the overall SRL of the students might be associated with students' limited exposure to online learning, due to which students may not have formed their beliefs over their SRL strategy use. Additionally, there are reports in the literature that are wary of self-report measures which may not truly depict the SRL use of learners. Roth, Ogrin, and Schmitz (2016) explained that such measures may be risky due to the fact that respondents might select the items that seem useful rather than actually reporting their strategic actions or beliefs. Winne's (2010) statements are also in line with their finding since self-report measures may fail to capture the dynamic nature of SR and students' SR is not likely to remain unchanged during the course of an intervention. It may additionally be argued that a domain-specific measure for language learning may have more accurately portrayed the SRL of students. On the other hand, while some studies revealed that technology-enhanced learning opportunities made a positive impact on the learners' SRL (Kondo et al. 2012; Pangburn 2020), the same results were not repeated in this study.

Considering the OSRLQ subscales, the only improvement was found in the reported use of help seeking strategies. Based on the instrument, help seeking is soliciting social assistance from the teacher or peers. This increase is justifiable considering DI strategies involve a great deal of working in mixed or matched-ability groups as a result of formative assessment and close monitoring of the teacher, varying degrees of peer and teacher scaffolding. This finding is in compliance with other studies that indicated perceived teacher support influences the use of social assistance (Karabenick and Dembo 2011; Kozanitis, Desbiens, and Chouinard 2007). On the other hand, the increasing use of help seeking during distance education contrasted with previous studies that demonstrated help seeking and peer learning were among the least used strategies during remote learning (Jung 2020; Ganieva et al. 2020).

### ***Students' perceptions about DI***

The content analysis revealed that five categories signposted the students' experiences with DI and overall, they held positive views towards DI, referring to a sense of maximizing their learning mainly due to formative assessment and individualized feedback using a digital platform, which also helped them improve self-evaluation, help seeking and goal setting to reach academic achievement. Previous studies reported similar findings in which students appreciated differentiation strategies to enhance their learning experiences (Leblebici 2020; Liao 2015; Pablico, Diack, and Lawson 2017; Park 2018). With respect to Tomlinson's model, the focus group insights mainly pointed to satisfaction with the differentiation of learning process as ongoing formative assessment and the instructional strategies following it was central to their positive comments.

Additionally, digitalizing DI strategies prompted a positive reaction among students as supported in several earlier studies as well (Deunk et al. 2015; Gülşen and Mede 2018). Abid et al.'s (2021) study also reported that faculty members viewed DI practices to improve the quality of the lesson delivery in online learning. Similarly, Romero-Ivanova et al. (2020) reached parallel conclusions as student teachers regarded differentiated ways of production and grouping arrangements positively during online teaching.

Based on students' responses, their target setting, help seeking and self-evaluation skills improved thanks to the practices of formative assessment, individualized feedback, and different grouping arrangements. Tomlinson and McTighe (2006) argued that providing feedback on formative activities could go hand-in-hand with self-evaluation and target setting, as was the situation in this finding. Brookhart (2011) supported this stance by explaining that regular formative feedback has the potential to improve students' SRL. Regarding online learning, Güvenç (2021) also reported that a teacher-researcher observed virtual DI practices improved the students' autonomous learning. Ontaneda Rea (2019) revealed similar findings in a study that used collaborative speaking tasks and peer and teacher feedback on a digital platform. It was found that this practice helped students improve their self-assessment skills. This finding is in line with Karabenick and Dembo's (2011)

study, which reported that the relationship between target setting and help seeking has been well established in the literature.

As for the mixed reactions towards the fluid grouping arrangements, doubts may have been caused due to the lack of common grounds that the students shared even though they were in similar readiness levels or their groups were mixed to maximize peer learning. This finding concurred with Park (2018) who reported that students were not engaged in the activities when they felt they did not belong to a class. In this study, the students' negative feelings regarding the online group they worked with sometimes had a negative impact on their learning experiences. This finding was also supported in the work of Dillenbourg, Järvelä, and Fischer (2009), who emphasized that collaborative learning does not automatically result in positive learning outcomes, which rather depend on the degree to which groups are involved in productive collaboration, and the effort to construct knowledge is the real issue for the learning to happen. Finally, Xie et al. (2019) shared similar findings reporting that the perceived group cohesion of tertiary students influenced their own SRL strategies.

## Conclusion

The present study provided further insight into the EFL learners' distance learning experiences with DI, more specifically on their language achievement and SRL. The results revealed that employing DI strategies in a remote learning setting and/or using digital platforms improved student learning outcomes and promote the use of SRL strategies. Specifically, differentiation in the process of learning and based on students' readiness levels involved the regular use of formative assessment and tailored feedback as well as purposeful grouping, thanks to which the students in the experimental group improved their speaking achievement, became more self-guided learners and reported a sense of empowerment in terms of school success and directing their own learning.

## Limitations

This study had several limitations to be addressed in further research. First of all, the sample size was limited due to the contextual restraints that included the classroom population at the institution. The results could have been more generalizable with larger sample size. Secondly, the length of the implementation could have been longer if the institution did not have a modular system, which was eight weeks long. A longer implementation could shed more light on the effects of virtual DI on EFL students. Finally, the student gains of the course objectives were only measured using a speaking test due to the limitations of online education. Therefore, this study could be designed to include all language skills and also vocabulary and grammar to depict a more thorough picture of student intake as a result of DI.

## Suggestions for further research

Considering the findings of the present study, future research can select a larger sample size to generate more generalizable results about the implementation of DI in virtual settings. Additionally, in future studies, virtual DI practices can be implemented over a longer period of time to monitor the students' progress over a longer period of time. More than one method of measuring achievement could be employed for a more thorough understanding of changes in the students' EFL achievement. Last but not least, the changes in the learners' SRL can be monitored through more process-based methods such as journals, which could provide a deeper insight into their self-regulatory abilities and how they are influenced by the DI practices.

## Practical implications

This study yielded several practical recommendations for practitioners. First of all, it would be advisable for language teachers to start DI by focusing on one area of language, such as one of the skills, or start by trying out one method for differentiation, such as readiness, interests or learning profiles. Trying out several methods or differentiating all areas of language teaching might be overwhelming. Secondly, for online learning environments, group cohesion must be closely monitored as it is likely to be harder to keep track of in distance learning than in traditional classrooms. Therefore, it would be a good idea to invest in building rapport with the students and encourage a formative classroom environment. Following that, it is of utmost importance to get the reflections of the students and the emotional temperature of the class regarding the DI practices. Thirdly, reading the actual classroom accounts of DI practitioners or students might be helpful in determining which DI practices suit the learning context. In this respect, the literature offers a growing number of books and studies that elaborate on the DI strategies and the perceptions concerning them. As a final recommendation, it could be said that there are many digital platforms to make differentiation easier to implement and to get quick information about the students' differences in their readiness levels, interests, and learning profiles. For larger groups of students, formative assessment platforms such as the one used in this study produce data regarding the readiness patterns of the students, which might serve as evidence for differentiating the learning environment or the content, process, or product of an instructional unit.

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## References

- Abid, T., G. Zahid, N. Shahid, and M. Bukhari. 2021. "Online Teaching Experience During the COVID-19 in Pakistan: Pedagogy–Technology Balance and Student Engagement." *Fudan Journal of the Humanities and Social Sciences* 14 (3): 1–25.
- Alioon, Y., and Ö Delialioğlu. 2019. "The Effect of Authentic m-Learning Activities on Student Engagement and Motivation." *British Journal of Educational Technology* 50 (2): 655–668.

- Barnard, L., W. Y. Lan, Y. M. To, V. O. Paton, and S. L. Lai. 2009. "Measuring Self-Regulation in Online and Blended Learning Environments." *The Internet and Higher Education* 12 (1): 1–6.
- Beck, D., and J. Beasley. 2021. "Identifying the Differentiation Practices of Virtual School Teachers." *Education and Information Technologies* 26 (2): 2191–2205.
- Bond, M., K. Buntins, S. Bedenlier, O. Zawacki-Richter, and M. Kerres. 2020. "Mapping Research in Student Engagement and Educational Technology in Higher Education: A Systematic Evidence map." *International Journal of Educational Technology in Higher Education* 17 (1): 1–30.
- Brookhart, S. M. 2011. "Tailoring Feedback." *The Education Digest* 76 (9): 33.
- Buckingham, L., and R. S. Alpaslan. 2017. "Promoting Speaking Proficiency and Willingness to Communicate in Turkish Young Learners of English Through Asynchronous Computer-Mediated Practice." *System* 65: 25–37.
- Chamberlin, M., and R. Powers. 2010. "The Promise of Differentiated Instruction for Enhancing the Mathematical Understandings of College Students." *Teaching Mathematics and Its Applications: An International Journal of the IMA* 29 (3): 113–139.
- Deunk, M. I., S. Doolaard, A. Smalle-Jacobse, and R. J. Bosker. 2015. Differentiation within and across classrooms: A systematic review of studies into the cognitive effects of differentiation practices. GION onderwijs/onderzoek, Rijksuniversiteit Groningen.
- Dillenbourg, P., S. Järvelä, and F. Fischer. 2009. "The Evolution of Research on Computer-Supported Collaborative Learning." In *Technology-enhanced Learning*, edited by N. Balacheff, S. Ludvigsen, T. de Jong, A. Lazonder, and S. Barnes, 3–19. Dordrecht: Springer.
- Faber, J. M., H. Luyten, and A. J. Visscher. 2017. "The Effects of a Digital Formative Assessment Tool on Mathematics Achievement and Student Motivation: Results of a Randomized Experiment." *Computers & Education* 106: 83–96.
- Ganieva, M., G. Khorokhorina, N. Pletneva, and S. Fomina. 2020. EFL Students' Use of Self-Regulated Learning Strategies in Online Educational Setting. In 2020 *The 4th International Conference on Education and Multimedia Technology* (pp. 156-160).
- Gheysens, E., C. Coubergs, J. Griful-Freixenet, N. Engels, and K. Struyven. 2020. "Differentiated Instruction: The Diversity of Teachers' Philosophy and Praxis to Adapt Teaching to Students' Interests, Readiness and Learning Profiles." *International Journal of Inclusive Education*, 1–18. doi:10.1080/13603116.2020.1812739.
- Gülşen, E., and E. Mede. 2018. Effects of Online Differentiated Reading on Reading Comprehension and Learner Autonomy of Young Learners." *ELT Research Journal* 8 (3): 127–157.
- Güvenç, G. 2021. "The Impact of Virtual Differentiated Instruction Practices on Student and Teacher Perceptions in English Language Teaching: Virtual Differentiated Instruction Practices." *International Journal of Curriculum and Instruction* 13 (3): 3146–3164.
- Güzel, S., and S. Aydin. 2016. "The Effect of Second Life on Speaking Achievement." *Online Submission* 6 (4): 236–245.
- Halici Page, M., and E. Mede. 2018. "Comparing Task-Based Instruction and Traditional Instruction on Task Engagement and Vocabulary Development in Secondary Language Education." *The Journal of Educational Research* 111 (3): 371–381.
- Hall, T. 2002. *Differentiated Instruction*. Wakefield: National Center on.
- Idrus, F., N. A. Z. Asri, and N. N. Baharom. 2021. "Has Differentiated Instruction Gone 'Awry' in Online Teaching and Learning?" *Journal of Language Teaching and Research* 12 (3): 501–510.
- Ivankova, N. V., J. W. Creswell, and S. L. Stick. 2006. "Using Mixed-Methods Sequential Explanatory Design: From Theory to Practice." *Field Methods* 18 (1): 3–20.
- Jung, S. H. 2020. "EFL Students' Self-Regulation in Synchronous Online Classes Using Zoom." *Multimedia-Assisted Language Learning* 23 (4): 72–90.
- Karabenick, S. A., and M. H. Dembo. 2011. "Understanding and Facilitating Self-Regulated Help Seeking." *New Directions for Teaching and Learning* 2011 (126): 33–43.
- Kilis, S., and Z. Yildirim. 2018. "Online Self-Regulation Questionnaire: Validity and Reliability Study of Turkish Translation." *Cukurova University Faculty of Education Journal* 47 (1): 233–245.
- Kondo, M., Y. Ishikawa, C. Smith, K. Sakamoto, H. Shimomura, and N. Wada. 2012. "Mobile Assisted Language Learning in University EFL Courses in Japan: Developing Attitudes and Skills for Self-Regulated Learning." *ReCALL* 24 (2): 169–187.
- Koo, T. K., and M. Y. Li. 2016. "A Guideline of Selecting and Reporting Intraclass Correlation Coefficients for Reliability Research." *Journal of Chiropractic Medicine* 15 (2): 155–163.
- Kozanitis, A., J. F. Desbiens, and R. Chouinard. 2007. "Perception of Teacher Support and Reaction Towards Questioning: Its Relation to Instrumental Help-Seeking and Motivation to Learn." *International Journal of Teaching and Learning in Higher Education* 19 (3): 238–250.
- Leblebici, B. 2020. *Learning through differentiated instruction: Action research in an academic English class* (Master's thesis). <http://etd.lib.metu.edu.tr/upload/12625003/index.pdf>.
- Liao, H. C. 2015. "EFL Learner Perceptions of Differentiated Speaking Assessment Tasks." *English Teaching & Learning* 39 (1): 29–68.
- Magableh, I. S. I., and A. Abdullah. 2020. "On the Effectiveness of Differentiated Instruction in the Enhancement of Jordanian Students' Overall Achievement." *International Journal of Instruction* 13 (2): 533–548.

- Marek, Michael W., and Wen-chi Wu. 2011. Using Facebook and SKYPE as Social Media in an EFL conversation class. Paper presented at the 28th International Conference on Teaching and Learning in the ROC, National Taichung University of Education, Taichung, Taiwan. <https://www.researchgate.net/publication/267027399>.
- McFarlane, D. A. 2012. "Facilitating and Dealing with Learner Differences in the Online Classroom." *European Journal of Educational Research* 1 (1): 1–12.
- Morgan, H. 2014. "Maximizing Student Success with Differentiated Learning." *The Clearing House: A Journal of Educational Strategies, Issues and Ideas* 87 (1): 34–38.
- O'Connor, C., and H. Joffe. 2020. "Intercoder Reliability in Qualitative Research: Debates and Practical Guidelines." *International Journal of Qualitative Methods* 19: 1609406919899220.
- Ontaneda Rea, M. D. L. 2019. Facilitating self-regulation by mobile devices to improve speaking skills in a post baccalaureate technical school (Master's thesis, Universidad Casa Grande. Departamento de Posgrado).
- Pablico, J., M. Diack, and A. Lawson. 2017. "Differentiated Instruction in the High School Science Classroom: Qualitative and Quantitative Analyses." *International Journal of Learning, Teaching and Educational Research* 16 (7): 30–54.
- Pangburn, A. C. 2020. Helping College Mathematics Students Facilitate Their Self-Regulated Learning Skills and Mathematics Self-Efficacy While Using MyMathLab (Doctoral dissertation, University of South Carolina).
- Paredes, J. P. 2017. "The Effect of Differentiated Instruction Strategies in the Learning of Vocabulary, Grammar and Reading among EFL Learners." *Modern Journal of Language Teaching Methods* 7 (3): 191.
- Park, Z. 2018. Middle school student perception and understanding of differentiated instruction: A phenomenological study.
- Perry Hinton, D., P. R. Hinton, I. McMurray, and C. Brownlow. 2004. *SPSS Explained*. East Sussex: Routledge.
- Reis, S. M., D. B. McCoach, C. A. Little, L. M. Muller, and R. B. Kaniskan. 2011. "The Effects of Differentiated Instruction and Enrichment Pedagogy on Reading Achievement in Five Elementary Schools." *American Educational Research Journal* 48 (2): 462–501.
- Romero-Ivanova, C., M. Shaughnessy, L. Otto, E. Taylor, and E. Watson. 2020. "Digital Practices & Applications in a COVID-19 Culture." *Higher Education Studies* 10 (3): 80–87.
- Roth, A., S. Ogrin, and B. Schmitz. 2016. "Assessing Self-Regulated Learning in Higher Education: A Systematic Literature Review of Self-Report Instruments." *Educational Assessment, Evaluation and Accountability* 28 (3): 225–250.
- Roy, A., F. Guay, and P. Valois. 2013. "Teaching to Address Diverse Learning Needs: Development and Validation of a Differentiated Instruction Scale." *International Journal of Inclusive Education* 17 (11): 1186–1204.
- Siddiqui, O., and F. M. Alghamdi. 2017. "Implementing Differentiated Instruction in EFL Remedial Classes: An Action Research." *Education and Linguistics Research* 3 (2): 89–101.
- Sink, C. A., and H. R. Stroh. 2006. "Practical Significance: The Use of Effect Sizes in School Counseling Research." *Professional School Counseling* 9 (5): 401–411.
- Tomlinson, C. A. 2001. *How to Differentiate Instruction in Mixed-Ability Classrooms*. Alexandria: ASCD.
- Tomlinson, C. A., and J. McTighe. 2006. *Integrating Differentiated Instruction & Understanding by Design: Connecting Content and Kids*. Alexandria: ASCD.
- Winne, P. H. 2010. "Improving Measurements of Self-Regulated Learning." *Educational Psychologist* 45 (4): 267–276.
- Xie, K., L. C. Hensley, V. Law, and Z. Sun. 2019. "Self-Regulation as a Function of Perceived Leadership and Cohesion in Small Group Online Collaborative Learning." *British Journal of Educational Technology* 50 (1): 456–468.