

## Research Article

# Psychological Factors Affecting Language-Learning Process in Saudi Arabia: The Effect of Technology-Based Education on High School Students' Motivation, Anxiety, and Attitude through Flipped Learning

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In recent years, technology-based tools have been used frequently in learning English as a foreign or second language. In addition, many studies have been conducted to examine the effects of technology-based tools on developing different types of language skills and subskills. Along the same line, this research examined the impacts of flipped learning as a kind of technology-based instruction on Saudi Arabia students' motivation, anxiety, and attitude. To reach this objective, 58 students at the intermediate level from one high school in Riyadh city, Saudi Arabia, were selected and assigned to two equal classes (flipped class and traditional class). After that, both classes were pretested with a motivation questionnaire and an anxiety questionnaire. Next, the flipped class received the treatment by applying the flipped instruction and the students of the other class received traditional instruction. After teaching six texts from Active Reading 1, the abovementioned motivation and anxiety questionnaires were readministered to both classes. Additionally, a questionnaire was given to the flipped class to find out how they felt about using flipped instruction for English language development. The results of independent samples and paired samples *t*-tests revealed that the flipped class outdid the traditional class both on the motivation and anxiety posttests. The outcomes discovered that using flipped instruction increased the students' motivation and reduced their learning anxiety. Also, the results of the one-sample *t*-test depicted that the students of the flipped class presented a positive attitude toward the flipped instruction. This research may encourage English as a foreign language instructors to integrate technology into their teaching to improve learning results.

## 1. Preliminaries

The current era's technology has significantly changed how people communicate with one another [1]. Today's technology has altered teaching and learning methods due to its constant advancements [2, 3]. It provides plenty of chances for English as a foreign language (EFL) students to converse naturally with native speakers in a foreign language setting [4]. Technology

incorporation in the instructional setting has provided teachers and students with exciting potential to improve the effectiveness of the pedagogical process [5]. Spector and Yuen [6] described educational technology as a theory and practice of developing, generating, utilizing, and assessing learning resources and processes in this regard. According to Zengin and Aksu [7], technical advancements, including the internet, computer, emails, mobile programs, and digital games, have an

impact on education. Most scholars would accept that technology has greatly developed the teaching and learning processes. For instance, Clark-Wilson et al. [8] state that technology has highly changed the ways teachers teach and pupils learn. Based on Raja and Nagasubramani [9] and Naw [10], technology has four roles in the field of education: it is considered as a part of the curricula, as an educational delivery instrument, as a tool for helping instruction, and also as an instrument to improve the whole learning process. Technology has converted passive instruction into an active one.

Technology has diverse sorts of modes: one of which is flipped instruction. According to Wiginton [11], flipped instruction is a paradigm of educational instruction that moves lectures and homework assignments online. When instructors deliver lectures via video content that pupils can watch at home or elsewhere, class time can be utilized for more useful tasks. Additionally, flipped training offers language learners a personalized, student-centered learning environment. The purpose of the flipped classroom is to transfer knowledge outside of the classroom and force teachers and learners to focus on production during class time [12]. The following are some benefits of the flipped learning approach: (1) learners arrive at class prepared, with the same level of pertinent knowledge and information, ready for language learning; (2) active learning sessions encourage student engagement in activities by having them apply knowledge and theory learned outside of class; and (3) students' motivation is raised because they are held responsible for one another for their participation in activities [13].

Utilizing flipped instruction can be effective on foreign language learners' emotional states, like motivation and anxiety. In studies into foreign language learning, motivation is a topic that has received extensive attention. According to Gardner [14], motivation is "an amalgamation of effort and desire to attain the aim of language learning" (p. 254). Broussard and Garrison [15] added that motivation is "the quality that motivates us to perform or do not perform something" (p. 106). According to Csizér and Dörnyei [16], motivation is a notion that explicates why individuals treat others as they do rather than how successful their behaviors will be (p. 20). Students' desire or willingness to be engaged with or commit an effort to do an activity is how motivation is typically defined [17–20]. Students are less inclined to cooperate, accept accountability, or completely involve in the language-learning process if they lack the desire to learn. Motivation is viewed as a crucial emotional state that impacts the success of foreign language learning, according to Dörnyei [21].

According to Aydn [22], anxiety is an effective factor that significantly influences the English learning language. Self-perception, attitude, feeling, and behavior associated with classroom language learning emerging from the uniqueness of the process of language learning according to Horwitz et al. [23] were described as FL anxiety. Based on MacIntyre and Gardner [24], it is the sensation of pressure and dread that is uniquely connected to situations involving the use of a second language, such as speaking, listening, and learning. It is said that language learning anxiety could result in issues for FL students [25]. The study experience

may not be enjoyable for language learners who are more concerned about their FL acquisition, which will have a detrimental impact on their performance [26].

Attitude is another major attribute that influences how well students learn a language. Conventionally, the attitude has been described as a complicated and enduring propensity that predisposes a person to act in a specific way [27–30]. According to Çakici [31], the influence of attitudes on the process of language learning ought to be taken into account as a sociopsychological element. According to Kudo [32], attitudes may be crucial to language learning because they seem to affect learners' failure and success with their studies. Similar to this, Klausmeier [33] points out that attitudes affect how well pupils behave and learn. According to Gardner [34], rather than students' enthusiasm in studying a foreign language or the individuals who speak the target language, students' attitudes toward target language learning are likely to be more significant to achieving a high competency in the target language. According to Çakici [31], learners who have a desirable attitude toward a language and the culture of that society find learning to be simpler, while those who have negative attitudes find learning to be more difficult.

As the above-defined emotional attributes are crucial for language learning development, in addition, as technology has got prevalent in educational systems, the present paper attempted to inspect the effects of flipped learning as a kind of technology-based instruction on EFL students' motivation, anxiety, and attitude. As most similar studies were done among institute learners, this research can be important as it was conducted among high school students rather than institute students. In addition, this research is significant since it tried to deal with the psychological factors of EFL learners rather than their cognitive factors. More importantly, reviewing the literature done so far, no study has been done in Saudi Arabia context on the effect of technology-based education on high school students' motivation, anxiety, and attitude through flipped learning. Thus, this study aimed to fill out this gap.

## 2. Literature Review

The student-centered method of learning, which varies from the teacher-centered model, is the foundation of the theoretical justification frequently given to explain the flipped method to the classrooms. The personal production of knowledge is stressed in the theories of Piaget and Vygotsky, which are the fundamental sources of student-centered learning theories [35–37]. Student-centered learning models and theories "may explain a transition in direct instruction from within the classrooms to outside," claim Bishop and Verleger [35] (p. 6). This provides extra time in the classroom for activities that focus on student learning.

Flipped instruction is also consistent with constructivist and student-centered learning strategies. Instead of relying solely on conventional teaching/learning methods, there is a need to promote student-centered learning that caters to their interests and encourages them to take the ownership of their learning [38–40]. The constructivist learning theory,

which emphasizes the students' critical participation in the process of meaning building from new knowledge and existing experience, forms the basis of student-centered learning [41, 42]. Teachers are, therefore, responsible for getting pupils involved in language-learning environments and for enhancing their language performance.

The primary benefit of flipped classrooms is that they give students a more flexible learning situation. The boundaries of the learning setting are no longer just the secure walls of the classroom. As a result, students can learn the material anywhere they like. Additionally, students who miss class for various reasons still have the opportunity to learn the material [43, 44]. The fact that students actively participate in their education is another key aspect of flipped classrooms. In flipped classrooms, students are active constructors since active learning is regarded under constructivism and socioconstructivism. In addition, students work together to study alongside their peers with the assistance of their professors [45]. Additionally, according to studies by Baepler et al. [46], Davies et al. [47], Namaziandost and Çakmak [48], and O'Flaherty and Phillips [49] flipped instruction can shift the burden of learning from teachers to students. According to Bergmann et al. [50], a flipped classroom model places the pupil in a position where they are responsible for their own learning.

Using flipped learning can be effective in reducing EFL learners' language learning anxiety. Zhang [51] stated that anxiety is connected to learners' motivation, performance, and self-confidence. Decreasing students' levels of anxiety can be effective in terms of boosting their motivation to learn a language [52]. Concerning the effects of self-confidence, van Batenburg et al. [53] asserted that students' achievements in EFL oral interactions can be predicted by the increase in their self-confidence under strategically directed instruction.

In addition, flipped learning can be effective for boosting EFL learners' language learning motivation. Motivation is regarded as the intensity and direction of the learners' efforts. The intensity of effort is referred to the extent that students attempt to achieve their goals and the direction of effort refers to the goals that students intend to reach [54]. Motivation is an innate phenomenon that is affected by four factors: aim (the aim of behaviors, purposes, and tendencies), instrument (instruments used to reach objectives), situation (environmental and outer stimulants), and temper (inner state of the organism). To reach their objectives, people first should acquire vital incentives. For example, academic accomplishment motivation is significant to scholars [55–57].

Using new methods such as flipped teaching can help EFL learners to present positive attitudes toward language learning. Learning attitude has a strong effect on students' behaviors and subsequently on their performance [58]. Those students who have appropriate beliefs about language learning are willing to present more positive attitudes about language learning. On the other hand, having negative beliefs can lead to negative attitudes, class anxiety, and low cognitive achievements [59–62].

The anchored teaching theory is an important idea that helps to explain the results of this research. Students utilize

technology as the vehicle to uncover issues, raise questions about those issues, and finally find solutions to those issues. The core material of the students' investigations is the reality of the living world [63]. The "Jasper Woodbury Video Series" is a well-known piece of teaching that was developed using the Anchored Instruction Theory as its guiding principle. There is a total of twelve video adventures included on the Jasper Woodbury Video Series CDs. Students can recognize and resolve mathematical issues via the use of those 12-exciting tales. Each action-packed tale is crafted following the United States National Mathematics Framework Standards, which are outlined by the United States National Association of Teachers of Mathematics. Students are presented with a wide range of chances to analyze and solve mathematical problems during each video adventure episode. Students can achieve mastery learning in a variety of subjects and abilities when they have the chance to study in ways that are both interactive and collaborative, such as in the natural sciences, social sciences, literature, and history. Another supporting theory is the cognitive flexibility theory, which comes from the notion of cognitive representation. Those who subscribe to this school of thought think that the learning process takes place in domains that are convoluted and poorly organized [64, 65]. According to the cognitive flexibility idea, learning must take place in its own unique setting, but it also requires informational assistance from a wide variety of domains. Instruction must be able to present students with a variety of learning scenarios so that students have a large space in which to construct their own knowledge and can make use of appropriate strategies to learn within a particular setting. This idea exerts a significant amount of impact on network and interactive technologies, and it has found widespread application in the realms of medicine and public health. The purpose of the theory of diffusion of innovations is to explain the model of how every invention is received. Via the realm of educational technology, the primary area of application for this idea is within educational technology instruction. The theory of innovation diffusion explains the phases of technological innovation, the procedure, and properties of acknowledging new technologies, as well as the involvement of recipients in the process of technological innovation [66–68].

Some empirical investigations scrutinized the impact of flipped education on language learning, for instance, Basal [69] sought to investigate how English language instructors at a state university in Turkey felt about using flipped courses. His flipped classroom technique involved a total of 47 first-year preservice instructors from three courses. He concluded that preservice English instructors had favorable opinions of flipped instruction as a crucial component of face-to-face training.

In a study with 42 students, Unakorn and Klongkratoke [70] inspected the usefulness of adopting flipped instruction in language learning. They claimed that the flipped classroom helped pupils to manage their classroom time more effectively and attain higher levels of learning. Moreover, the flipped instruction gave pupils more chances to interact with their teacher and one another.

Huang and Hong [71] explored the effect of a flipped English class on information and communication technology (ICT) that primarily focused on reading comprehension abilities. The experimental group, made up of forty students, was chosen at random; the control group, made up of 37 students, was chosen at random as well. At the start and conclusion of the study, each participant answered a questionnaire that assessed the students' ICT. Four students from the experimental group who received the lowest pretest scores were selected to complete an interview as part of the posttest. The findings depicted that the experimental participants made progress in their comprehension of English reading. The quantitative results demonstrated that the interview and observational results were reliable.

The effects of flipped education on the development of speaking abilities in aspiring English language instructors were examined by K rođlu and  akır [72]. To gather data, pre- and posttests were given to both the experimental and the control groups. The results demonstrated that after an eight-week treatment period, there was a statistically substantial difference amongst groups at 0.00 (Sig. > 0.05) levels. It was discovered that the experimental participants made considerable progress in their ability to write with coherence, fluency, lexical variety, accuracy, pronunciation, and grammar.

The efficiency of flipped-based instruction in fostering learning motivation and self-confidence among high school students was examined by Fallah et al. [73]. Pretest, posttest, control group, and quasi-experimental research design were all applied in this research. All female high school pupils in Ahvaz city during the 2019–2020 academic year were included in the statistics population. Thirty people were chosen and split into control and experimental groups ( $n = 15$  for each group) using the purposive sampling technique. The student self-efficacy scale and the academic motivation questionnaire were the study tools. The control class was given the conventional teaching strategy while the experimental class participated in eight 90 min sessions of the flipped teaching program. The analyses of the data were conducted applying analysis of covariance (ANCOVA). The results showed a significant difference between the experimental and control groups when employing the flipped classroom method and conventional teaching techniques. The flipped classroom method was successful in raising students' self-efficacy and academic motivation.

In another research, Hashemifardnia et al. [74] investigated how flipped instruction affected the speaking complexity, accuracy, and fluency (CAF) of Iranian EFL students. For achieving this objective, 96 Iranian EFL students took the Oxford Quick Placement Test (OQPT), and 60 of them scored at the intermediate level. These 60 students were then split into two groups: experimental and control. Then, a speaking pretest was given to the respondents of both classes. The experimental participants subsequently got education using flipped instruction. The control participants, on the other side, received their instruction in a conventional classroom without Internet access. Following the 13-session course of therapy, the members of the experimental participants were given a questionnaire to fill out about their

opinions regarding adopting flipped instruction to understand more about their perspectives. For assessing the impacts of flipped instruction on both groups' speaking CAF, a speaking posttest was given to each group. According to the results of the study, there were substantial differences between the posttest results of the control and experimental classes, favoring the experimental class. Additionally, the findings of the questionnaire revealed that the participants presented favorable opinions about employing flipped instruction in speaking sessions.

Recently, the anxiety and autonomy of Iranian EFL students were examined by Parvaneh et al. [75] for both short- and long-term consequences of the flipped instruction method and language competency. Ninety-four students at the advanced, intermediate, and elementary levels were chosen from Payam-e-Nour University using a convenience (availability) sampling approach and separated into experimental and control groups. The research methodology used a pretest–posttest design with a nonequivalent control group. A factorial ANCOVA and a sample-paired  $t$ -test were run to evaluate the data. The research outcomes show that the participants' learner autonomy and language anxiety were significantly impacted by flipped classes. However, learner autonomy and language anxiety did not differ statistically significantly across language competency levels. Additionally, results indicated that learners' autonomy and language anxiety may have been affected in a lasting way by flipped classes.

More recently, at Shiraz University of Medical Sciences, Nourinezhad et al. [76] scrutinized the effectiveness of flipped instruction on medical students' writing skills and self-efficacy. This experimental study involved 50 students. They were separated into two groups: one with 25 pupils in the therapy group and another with 25 in the control group. The experimental class received flipped learning training while the control class received conventional writing training. According to the findings, learners who received flipped instruction performed better in their writing assignments than those who received traditional training.

Most studies reviewed above examined the impacts of flipped instruction on language skills and subskills. Only a few of them were done on emotional variables involved in language learning. Indeed, there is a paucity of empirical studies on the effectiveness of flipped instruction on students' anxiety, motivation, and attitudes. To fill this gap, our research attempted to survey the impacts of flipped learning on Saudi Arabia high school students' motivation, anxiety, and attitude by raising the following research questions:

- (RQ1) Between traditional instruction and flipped instruction, which one is more effective for increasing Saudi Arabia EFL students' learning motivation?
- (RQ2) Between traditional instruction and flipped instruction, which one is more effective for reducing Saudi Arabia EFL students' language learning anxiety?

- (RQ3) Do Saudi Arabia EFL students present positive attitudes toward flipped instruction for learning the English language?

Regarding the aforementioned questions, the following hypotheses were formulated:

- (HO1) Neither traditional instruction nor flipped instruction is effective for increasing Saudi Arabia EFL students' learning motivation
- (HO2) Neither traditional instruction nor flipped instruction is effective for reducing Saudi Arabia EFL students' language learning anxiety
- (HO3) Saudi Arabia EFL students do not present positive attitudes toward flipped instruction for learning the English language

### 3. Method

*3.1. Design of the Study.* Because the participants were not selected randomly, a quasi-experimental design was used in this research. Consequently, the participants were chosen based on a nonrandom sampling method. One experimental group and one control group were included in this investigation. Motivation, anxiety, and attitude were the independent variables, and flipped learning was the dependent variable of this research.

*3.2. Participants.* Deciding to do this research, 58 Saudi Arabia EFL students were chosen among 73 students by a nonrandom sampling method. They were chosen from one high school in Riyadh, Saudi Arabia. Their age range was between 17 and 18 and their level of English proficiency was intermediate, which was measured by the OQPT. Because of gender segregation, our participants were only male that was divided into two equal classes: flipped ( $n=29$ ) and traditional ( $n=29$ ).

*3.3. Instrumentations.* The OQPT was the first instrumentation utilized in the current paper to homogenize the participant population. This test was utilized to help the researchers select the intermediate students as the participants of their research. The test had sixty multiple-choice questions, and those who scored between 40 and 47 were considered intermediate and were chosen as the study's target participants. This test was developed by Oxford University Press and the University of Cambridge Local Examinations Syndicate. The test has been validated in 20 countries by more than 6,000 students and its reliability has reached 0.90 [77].

The other instrument used in this investigation was a motivation questionnaire adapted from Gardner's [78] Attitude/Motivation Test Battery. It should be noted that only 74 of the 104 statements in the original version of the questionnaire were chosen to be used in this study. In fact, those items that assessed the students' instrumental and integrative motivation, and attitude toward language learning were extracted from the original questionnaire and were used in our study. We used a five-point Likert-type from

totally disagree to totally agree. All items were translated into Arabic to assist the students to comprehend them completely. The validity of the translated version was substantiated by some experts in applied linguistics. The reliability index of this instrument was estimated at 0.82 based on the Cronbach's alpha. This questionnaire was used twice in this research: once as the motivation pretest and once as the motivation posttest.

The Foreign Language Classroom Anxiety Scale, created by Horwitz et al., served as the third research tool [23]. This scale had 33 items, which were a bit modified and translated into Arabic to help students answer them easily. Then, some English experts in applied linguistics read the items and confirmed their validity. Next, the reliability index of the anxiety questionnaire was computed by Cronbach's alpha formula ( $r=0.89$ ). The items were utilized as the pretest and posttest for this study's anxiety scale, which was a five-point Likert scale.

The last instrument was the attitude questionnaire created by the researchers to solicit the students' attitudes toward flipped instruction. This instrument had 20 statements about the participants' attitudes toward applying flipped instruction. The Likert scale was utilized in this questionnaire to show the extent of disagreement and agreement from 1 to 5: completely disagree, disagree, no idea, agree, and completely agree. Based on Cronbach's alpha, the reliability index of this questionnaire was ( $r=0.84$ ). Like other instruments, some English experts in applied linguistics confirmed the validity and appropriateness of this questionnaire.

*3.4. Procedures.* To perform the current study, 58 high school students were selected and divided into a traditional class and a flipped class. Then, a questionnaire of motivation and a questionnaire of anxiety were given to both classes as the research pretests. Next, the main treatment was started; in the flipped class, the students were sent a text from Active Reading 1 and they were required to practice it at home. In addition, the teacher (researcher) sent them a short video clip containing the key points of the text, important words, and some questions about the text to watch at home before attending the class. As the members of the flipped class were required to preview the texts before coming to class, a checklist on the Telegram application was created to know the participants who did the assignments and came to class prepared each day. The participants of the flipped class cooperatively learned and practiced the text on the Telegram application. When they attended the class, the teacher answered the students' questions and solved their problems and finally, he gave a quiz. Six reading texts were trained to this group based on a flipped-based instruction.

The same reading passages were taught to the other class traditionally. The teacher personally attended the class and started teaching a text: first, he provided some background information for the learners; second, he read the text and translated it for them; third, he required the learners to answer the related questions based on the text. The participants were required to do the exercises from their textbook as their out-of-class activities. After teaching six reading texts

TABLE 1: The two groups' descriptive statistics from the motivation pretest.

Groups	N	Means	Std. deviations	Std. error means
Traditional	29	87.72	6.52	1.21
Flipped	29	88.58	6.86	1.27

TABLE 2: Independent samples *t*-test of both groups on the motivation pretest.

		Levene's test for equality of variances		<i>t</i> -test for equality of means						
		<i>F</i>	Sig.	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean difference	Std. error difference	95% confidence interval of the difference	
								Lower		Upper
Scores	Equal variances assumed	0.12	0.72	-0.49	56	0.62	-0.86	1.75	-4.38	2.66
	Equal variances not assumed			-0.49	55.86	0.62	-0.86	1.75	-4.38	2.66

to both classes, the mentioned motivation and anxiety questionnaires were readministered as the posttests of the research for checking the impacts of the flipped instruction. Finally, the attitude questionnaire was given to the flipped class students to check their attitudes about flipped instruction.

**3.5. Analyses of Data.** Collected the needed data using the above-stated procedures, and the researchers analyzed them according to the objectives and questions of the research. Statistical tools such as independent samples and paired samples *t*-tests were run to measure the effectiveness of the intervention on the participants' learning motivation and anxiety. Besides, a one-sample *t*-test was exploited to analyze the data of the attitudinal questionnaire.

#### 4. Findings of the Study

The necessary data were gathered, and then the analysis began to provide the results. It should be noted that after getting sure about the normality distribution of the data via the Kolmogorov-Smirnov test, parametric statistics, including independent samples and paired samples *t*-tests, were used to measure the impacts of the intervention on the participants' learning motivation and anxiety.

As presented in Table 1, the mean score of the traditional class is 87.72 and the mean score of the flipped class is 88.58 on the motivation pretest. According to the mean scores, both classes had the same level of motivation at the beginning of the research.

An independent samples *t*-test was performed in Table 2 to determine if there were substantial differences between the two groups' performances on the motivation pretests. The difference between the groups is not significant at the start of the treatment as Sig. (0.62) is higher than 0.05.

Table 3 displays the descriptive statistics of the two classes on the motivation posttests. They performed differently on the motivation post-tests since the mean score of

TABLE 3: The two groups' descriptive statistics from the motivation posttest.

		Groups	N	Mean	Std. deviation	Std. error mean
Scores	Traditional	29	91.31	9.01	1.67	
	Flipped	29	142.41	20.79	3.86	

flipped class ( $M = 142.41$ ) is higher than the traditional class ( $M = 91.31$ ).

According to Table 4, there are significant variations between the two groups' motivation post-test results at ( $p < 0.05$ ). Indeed, the flipped class gained better achievement than the traditional class on the posttest of motivation.

The motivation pre- and posttests of each group are compared using a paired samples *t*-test in Table 5. The motivation pretest and posttest differences in the conventional class are significant as Sig. (0.01) is smaller than 0.05, and similarly, the motivation pretest and posttest differences in the flipped class are significant since Sig. (0.00) is smaller than 0.05.

As the descriptive data in Table 6 shows, we might therefore say that the two classes performed similarly on the anxiety pretests because their mean scores were relatively similar.

Table 7 demonstrates that Sig. (0.83) is greater than 0.05, consequently, the differences between traditional and flipped classes are not very significant. As a result, the anxiety pretests of the traditional and flipped classes do not differ significantly from one another.

Table 8 indicates the descriptive statistics of the two classes on the anxiety posttests. They performed differently on the anxiety post-tests as the mean score of flipped class ( $M = 81.10$ ) is higher than the traditional class ( $M = 55.37$ ).

The differences between traditional and flipped classes are clearly evident in Table 9 since Sig. (0.00) is less than 0.05. This table demonstrates that the anxiety posttest results of the flipped class are noticeably different from those of the traditional class.

TABLE 4: Independent samples *t*-test of both groups on the motivation posttest.

		Levene's test for equality of variances		<i>t</i> -test for equality of means						
		<i>F</i>	Sig.	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean difference	Std. error difference	95% confidence interval of the difference	
								Lower	Upper	
Scores	Equal variances assumed	14.36	0.00	-12.14	56	0.00	-51.10	4.20	-59.53	-42.67
	Equal variances not assumed			-12.14	38.16	0.00	-51.10	4.20	-59.62	-42.58

TABLE 5: Paired samples *t*-test (motivation pre and posttests of both groups).

		Paired differences			95% confidence interval of the difference		<i>t</i>	<i>df</i>	Sig. (2-tailed)
		Mean	Std. deviation	Std. error mean	Lower	Upper			
Pair 1	Traditional	-3.58	7.44	1.38	-6.41	-0.75	-2.59	28	0.01
Pair 2	Flipped	-53.82	23.45	4.35	-62.74	-44.90	-12.36	28	0.00

TABLE 6: The two groups' descriptive statistics from the anxiety pretest.

	Groups	<i>N</i>	Means	Std. deviations	Std. error means
Scores	Traditional	29	53.06	15.30	2.84
	Flipped	29	53.93	16.08	2.98

TABLE 7: Inferential statistics of the two groups on the anxiety pretest.

		Levene's test for equality of variances		<i>t</i> -test for equality of means						
		<i>F</i>	Sig.	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean difference	Std. error difference	95% confidence interval of the difference	
								Lower	Upper	
Scores	Equal variances assumed	0.04	0.82	-0.20	56	0.83	-0.86	4.12	-9.12	7.39
	Equal variances not assumed			-0.20	55.86	0.83	-0.86	4.12	-9.12	7.39

TABLE 8: The two groups' descriptive statistics from the anxiety posttest.

Groups	<i>N</i>	Means	Std. deviations	Std. error means
Traditional	29	55.37	16.03	2.97
Flipped	29	81.10	22.16	4.11

Table 10 demonstrates that while the differences between the anxiety pretest and anxiety posttest of the traditional class are not remarkable since Sig. (0.29) is larger than 0.05, they are significant for the flipped class because Sig. (0.00) is less than 0.05. It can be said that the students' anxiousness was positively impacted by flipped education.

The mean score of the students on the attitude questionnaire is 4.28 and their standard deviation is 0.33 (Table 11). A one-sample *t*-test was employed to determine whether favorable attitudes were attained in the attitude questionnaire.

It is observed in Table 12 that the learners' attitudes were significantly positive as the *p*-value was smaller than the

TABLE 9: Inferential statistics of the two groups on the anxiety posttest.

		Levene's test for equality of variances		<i>t</i> -test for equality of means						
		<i>F</i>	Sig.	<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean difference	Std. error difference	95% confidence interval of the difference	
								Lower	Upper	
Scores	Equal variances assumed	6.46	0.01	-5.06	56	0.00	-25.72	5.08	-35.90	-15.54
	Equal variances not assumed			-5.06	51.00	0.00	-25.72	5.08	-35.92	-15.52

TABLE 10: Paired samples *t*-test (anxiety pre and posttests of both groups).

		Paired differences			95% confidence interval of the difference		<i>t</i>	<i>df</i>	Sig. (2-tailed)
		Mean	Std. deviation	Std. error mean	Lower	Upper			
Pair 1	Traditional	-2.31	5.07	0.94	-4.24	-.37	-2.45	28	0.07
Pair 2	Flipped	-27.17	29.05	5.39	-38.22	-16.11	-5.03	28	0.00

TABLE 11: Descriptive statistics for attitudes of the flipped class.

<i>N</i>	Means	Std. deviations	Std. error means
20	4.28	0.33	0.07

TABLE 12: One-sample *t*-test results for the attitudes of the flipped class.

Test value = 0					
<i>t</i>	<i>df</i>	Sig. (2-tailed)	Mean difference	95% confidence interval of the difference	
			Lower Upper		
57.80	19	0.00	4.28	4.13	4.44

significance level ( $p < 0.05$ ). The students of the flipped group held favorable perceptions about using flipped education in English language classes.

In summary, the results show that using flipped instruction increases the motivation of EFL learners and decreases their language learning anxiety. Also, the findings show that Saudi Arabia EFL learners presented positive attitudes toward using flipped instruction for English language learning.

## 5. Discussion of the Results

To reach the answers to the research questions, several independent samples *t*-tests were used and their final results indicated that the differences between the groups' motivation and anxiety posttests were statistically significant. According to the findings in the previous section, the experimental

group performed better on the anxiety and motivation posttests. The results also showed that teaching in a flipped classroom could boost students' passion for learning and lower their learning anxiety. Not to forget that the outcomes demonstrated that the students in the current study had a favorable opinion of flipped-based education.

The gained results in this research are consistent with the previous research outcomes. For instance, the same as our research, Hashemifardnia et al. [74] in their research indicated that using flipped instruction developed the speaking accuracy, complexity, and fluency of Iranian EFL students. Also, our results are endorsed by Gok et al. [79] whose study indicated a substantial reduction in the foreign language classroom anxiety and foreign language reading anxiety levels of the students via using the flipped instruction.

Additionally, the findings we gained in our paper are supported by Parvaneh et al. [75] who surveyed the effects of implementing the flipped instruction on Iranian EFL students' anxiety and autonomy. Their research outcomes confirmed that flipped instruction generated long-term effects on reducing language anxiety and increasing autonomy. Besides, the present research results are in agreement with Nourinezhad et al. [76] who verified the effectiveness of flipped education on developing learners' writing performance and writing self-efficacy.

Moreover, our study results are compatible with the results of Koroğlu and Çakar [72] who indicated that using the flipped classroom produced constructive effects on improving the speaking skill of the preservice English language instructors. Similarly, the outcomes of this investigation are in harmony with Huang and Hong [71] whose research discovered that employing flipped instruction had a constructive impact on students' reading comprehension



skills. Also, our investigation is supported by Khoiriyah [80] who revealed that the listening comprehension abilities of EFL learners were improved by using flipped instruction.

Concerning the positive attitudes of the present research respondents toward flipped instruction, our findings are similar to Basal [69] whose research participants showed a positive perception about using flipped instruction as an essential part of face-to-face instruction. Also, our results are in line with Hashemifardnia et al. [74] who discovered that Iranian EFL students presented desirable attitudes toward flipped education. Furthermore, Villanueva [81] and Sirakaya and Ozdemir [82] indicated that the participants of their research warmly welcome the application of flipped instruction since it developed their performance, collaboration, and motivation.

The outcomes of this investigation agree with those outcomes obtained by Namaziandost et al. [83] and Farrah and Qawasmeh [84] who indicated that their respondents' attitudes toward the flipped instruction were positive. Equally, our study findings are advocated by the research of Marlowe [85] who discovered that the participants in her research had favorable attitudes toward flipped instruction. Additionally, our results are compatible with past investigations such as Al-Zahrani [86], Hung [87], and Talley and Scherer [88] owing to a favorable attitude toward the flipped classroom and attending the classes only for solving the problems.

Our findings lend support to the constructivist and student-centered theories. Instead of solely depending on traditional learning and teaching methodologies, teachers should encourage student-centered learning that meets the requirements of the students and encourages them to take ownership of their learning [39]. The constructivist learning theory, which emphasizes the students' vital part in the process of meaning building from new knowledge and existing experiences, is at the foundation of the student-centered approach.

In addition, our research is supported by information processing theory and cognitive theory, both of which were originally conceptual cornerstones in the interactive learning that took place between humans and computers. Although recent research has demonstrated that various theories can affect how models of people's interactions with computers are constructed [89]. For instance, since the study of a cognitive unit extends well beyond the framework of an individual's cognitive process, distributed cognition theory has also established a theoretical basis for the interactive learning and research that takes place between humans and computers. The cognitive development of an individual is not only dependent on the learning behaviors of that individual but also on that individual's cognitive understanding as well as their cultural background [90, 91]. The purpose of human-computer interaction in the learning process has not changed. However, academics and researchers have come to a common recognition of the cultural, environmental, and other impacts on the learning process, and they have implemented these factors into the evaluation of human interactive learning through computers [89].

The findings of this study support the theoretical hypotheses that flipped education makes it easy to access the subject being taught by utilizing videos, mobile tools, and the

Internet. Students can go at their own pace with the help of flipped education, and if they are unable to attend the class for any reason, they are still given the chance to learn about the subjects that are taught outside of traditional classroom settings [92–96].

One possible reason for the gained outcomes in this investigation can be due to more interactions that had occurred among the flipped-based group. More interactions with peers and teachers can result in better English learning as Asadi et al. [97] asserted that more interactions result in development in learning the English language among EFL learners. Also, the gained results can be ascribed to the nature of flipped instruction, which employs a process that has students take responsibility for their learning independently before entering a real-world classroom setting by practicing the courses and engaging in social networking group discussions, can also be credited with the success [74]. The flipped classroom, following Harris et al. [98], shifts educational responsibility from teachers to students; teachers assume the role of specialists who support students in developing their abilities and overcoming codependency.

The other explanation for our results can be ascribed to the merit of the flipped instruction, which is supplying the preclass materials in the forms of video and audio files and the students have the chance to read them at home both cooperatively and individually. One more reason why the flipped group outdid the control group can be that the students of the flipped group used various out-of-class activities that helped them to get more ready for the class.

The fact that flipped instruction can promote cooperation among the learners in the experimental group may serve as a further rationale for the results. This instruction is a collaboration-oriented model that helps students to improve their language learning cooperatively. Therefore, one can say that the learner-centered feature and the cooperative nature of flipped instruction can assist students to learn the English language more easily compared to conventional instruction.

The flipped classroom gives teachers and students more time during class to share knowledge. The class period is used for practicing or doing homework because the course material is learnt through an online tutoring system. Both teachers and students create a learning environment during the class time where they develop interactions. Scaffolding appears to be a component of the flipped classroom where students ask lecturers questions if they do not understand certain concepts in video lectures or other learning materials. In the classroom, the teachers address these issues and support students' learning. Additionally, in a flipped classroom, students work in groups or pairs so they can hone their social and academic abilities.

The reason for the positive attitudes of EFL students toward flipped education can be that the growth of online instructional resources, in terms of the prevalence and popularity of technology in routine life, can make learners eager to use flipped instruction [99]. In addition, having a tendency toward autonomy can be the other reason why the students held positive attitudes toward flipped instruction. The flipped-based learning targets students' needs and allows

them to monitor their learning and therefore develops their autonomy. The other justification for the positive attitudes of the students can be ascribed to the students' common need for benefiting from a student-centered education instead of a teacher-centered one.

The results of the present research can generate some implications for teachers and students. Therefore, our study findings can extend the teachers' attitudes toward the new teaching methods that may be more appropriate strategies to develop the students' learning, specifically in this era of technology. Accordingly, this flipped model of instruction is fertile for EFL learners in that they can discriminate which teaching model is more practicable in the learning process. This study might inspire EFL English teachers to use technology in their lessons so that students learn more effectively. The results of this research can motivate EFL English educators to share knowledge flexibly and interestingly while giving students more accountability for their own learning.

Students who miss class due to illness, travel difficulties, or any other reason can catch up with their friends more quickly and easily with the flipped classroom approach than with the traditional one, which may be of benefit to EFL learners as well. The flipped classroom concept places students in command of their own learning, in contrast to the traditional classroom style.

Teachers can allow pupils the freedom to learn at their own speed by offering lectures online. The flipped classroom can give EFL students plenty of chances to use the English language more effectively because they do not interact outside of the classroom. This study can benefit shy and introverted individuals who feel uncomfortable participating in face-to-face class activities. The results of this investigation may also inspire EFL material creators to seriously consider, including online instruction in EFL curricula, that currently only employ conventional methods of instruction and materials.

This study may persuade decision-makers in the field of education to consider the motivation of EFL students when planning online instruction. For teachers to use digital tools, they must offer them projectors, CD and DVD players, laptops, and computer laboratories. They might host academic sessions to help teachers boost students' motivation. They can offer online resources and conducive learning environments to encourage students' enthusiasm and good behavior. This study suggests that decision-makers should voice their ideas regarding using technology as a trustworthy source in English classes. The importance of motivation can prompt advisors to create plans to determine the factors that demotivate students and the challenges they face throughout language training [100].

## 6. Conclusion of the Research

Nowadays, the effect of technology on our daily lives is important. Using technology has made some changes in the learning and teaching processes and has opened a new window in language learning. Consequently, the major objective of this research was to assess the influences of a

technology-based education, i.e., the flipped instruction on EFL attitudes' learning anxiety and motivation. Also, the attitudes of the students about the implementation of flipped instruction were examined. This research found that using flipped instruction generated positive impacts on EFL students' learning anxiety and motivation. Also, this research discovered that the students indicated favorable attitudes about the use of flipped instruction in language learning and teaching. According to the findings, we can conclude that creating a variety of social networking platforms can help learners to receive more feedback faster.

The other conclusion is that applying flipped instruction can develop EFL learners' language learning more successfully in comparison with conventional education. One probable justification is that within conventional instruction, students do not have access to instructions and explanations from the teachers directly at home since they receive the information just in the classrooms and they have to do homework at home after the class. On the other hand, via using the flipped instruction, based on Abeysekera and Dawson [101], the learning motivation of the students can be increased when an instructional context provides an opportunity for learners to (1) feel a sense of connection to others students and teachers during learning and (2) to feel autonomy in self-regulating and decision-making. One more conclusion is that receiving feedback from the teachers in the classes, teacher's direction, classroom interactions among students, and collaborative participation aid students in doing their homework successfully. In this way, students are accountable for their own learning; they study pertinent materials based on their learning rapidity, their anxiety is diminished, and they become enthusiastic to continue learning the language.

Although the effectiveness of flipped learning as a kind of technology-based instruction was confirmed in this research, the incorporation of flipped learning into the process of teaching and learning includes some organizational and technical challenges. It needs several technological considerations before the introduction of flipped instruction to instructional settings. It is necessary to enhance EFL instructors' technological literacy in designing the activities and materials and utilizing various kinds of computer-based software or equipment and converting these activities and materials into useful classroom practices. Both teachers and students should become familiar with different kinds of technology-based instruments that are used in learning and teaching.

Within the last quarter of a century, there have been several significant advancements made in the contemporary classroom concerning the development of the learning environment. The availability of more advanced technological choices for pupils is largely responsible for the many positive effects that we have seen in this environment. To begin, the use of technology may assist youngsters in maintaining their interest in the process of learning. The vast majority of pupils detest being made to feel as if they are squandering their time by attending school. When technology is permitted in the classroom, instructors have the chance to provide students

the freedom to work at a speed that is most suited to them without disrupting the work of their classmates. They may work on more complex content using software, check for further information about a topic that they are studying that day, or play educational games that reinforce the lesson. Second, it fosters a greater level of contact between the school and the families of the students. There are more possibilities for instructors and parents to communicate with one another when there is technology present in the classroom. When used in the classroom, a blog provides an opportunity for parents to get insight into what their children are learning daily. Apps and software provide educators the ability to instantaneously report on a child's conduct and share that information with the child's parents so they are aware of what is going on at school in real time. Third, the costs associated with implementing various forms of technology in the classroom are rather low. Although the expense of integrating technology into the classroom may be large if you are presenting new possibilities to an entire school district, the cost of student laptops, tablets, and other necessities for the classroom is quite low. There are some advantages to using flipped classrooms, which are becoming one of the most common forms of learning that are supported by technology. The amount of one-on-one time that teachers can devote to each of their charges is significantly increased in an inverted classroom. Additionally, it provides a forum in which they can pose concerns or look for additional assistance with a subject that is proving difficult for them. In addition, the project-based work that is currently being done in the classroom does not necessarily have to be done on an individual basis. Students can spend more time collaborating in a flipped classroom, which is not only an excellent way for them to learn but also is beneficial for their ability to work together effectively. In addition, because "knowledge acquisition" now takes place outside of the classroom, every student can control the pace of their own learning and tailor it to their unique capacities and interests. A method that is based on traditional classroom instruction depends on every student absorbing and comprehending the material at the same time and at the same pace. The flipped classroom model does not. This can be an especially liberating experience for students who learn at a slower pace. They are no longer under the impression that it is their responsibility to "keep up," and instead have the freedom to educate themselves in whatever manner is most effective for them. They also have the option to review previously learned material whenever they like. Additionally, students are encouraged to come to class ready to learn by using the flipped classroom model. After students have interacted with digital content on their own time outside of school, they can come to class ready with thoughts and questions. It is an excellent method for involving students in the process of shaping the classroom sessions and, as a result, developing a sense of responsibility in the students.

Our research has some limitations: the population of the research included male high school students in Riyadh; therefore, there should be care in generalizing the results to students in other institutions, schools, cities, and countries.

Consequently, similar investigations are offered to scrutinize the influences of flipped instruction on the language learning of students from other cities, countries, and institutions. Only male students took part in this research; the results may not be generalizable to female students. Therefore, similar topics can be done on the females' language learning development. We could not check the teachers' attitudes about the effectiveness of the flipped instruction; next studies are recommended to examine the teachers' attitudes about using flipped instruction and other technology-based instructions. Due to some limitations, only 58 students participated in our study; to enrich their findings, other researchers are recommended to include more respondents in their studies. This study included three emotional factors (anxiety, motivation, and attitude); other studies can scrutinize the impacts of flipped-based instruction on other emotional attributes as well as other language skills and subskills. Furthermore, the employment of this approach requires some prerequisites including students' access to the Internet, smartphones, computers, etc. Therefore, such prerequisites should be considered before using this approach.

### Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

### Conflicts of Interest

The authors declare that they have no conflicts of interest.

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