Smart Automated Language Teaching Through the Smart Sender Platform

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Abstract: The purpose of the research was to identify whether the English language e-classes that are automated and delivered through the Smart Sender platform influence the students' attendance and procrastination rates, their motivation, time management skills, cognitive processing speed, and satisfaction. The study used qualitative and quantitative methods to monitor students' attendance and procrastination rates, motivation and engagement, time management skills, thinking speed, and satisfaction. The questionnaire on learning motivation, engagement, and competence, the time management skills test, the mental speed test, and the course satisfaction questionnaire were used to collect data. The focus group discussion questionnaire was used to obtain verbal feedback for the participants. The Smart Sender platform proved effective as an instructional tool for teaching the English Language to students majoring in Philology, International Business, and Law. The automated delivery of the English language e-classes was effective in addressing the issues of dropouts and procrastination in distance learning through automation of the lesson delivery based on the 'push' factor. It increased students' motivation, improves time management skills, and satisfaction. The quantitative findings showed that the students experienced a positive change in attendance, motivation and learning engagement, time management skills, and thinking speed due to the intervention. The students perceived the automated delivery-based approach to language teaching positively. They reported that the delivery approach content met the participants' expectations and needs. Focus group discussion revealed that the intervention changed their learning behaviour and strategies which were considered the improvements of the quality learning outcomes.

Keywords: *Higher education, foreign language teaching, smart technology, automated delivery, Smart Sender platform.*

Introduction

Automated language teaching seems to be a recent cutting-edge solution and an emerging alternative to conventional distance learning (Cambridge ALTA, 2020; Wasfy et al., 2013). This trend is driven by the number of opportunities it brings to educational stakeholders such as reduction of expenditures associated with the delivery of the theoretical courses, selection of better-qualified teachers, and become international market players in the educational field (Bobrytska et al., 2020; Ergin & Morche, 2018). However, the dropout rate is proved to be about 90% in Massive Open Online Courses (MOOCs) and this has been the greatest issue and challenge for over a decade for the instructors, tutors, and institutions (Gregori et al., 2018; Kotsiantis et al., 2003; Xavier & Meneses, 2020). According to Xavier and Meneses (2020), the common factors for the dropouts in the online mode of learning at higher educational institutions are students' inadequate and insufficient motivation, poor time management skills, and dissatisfaction. The Smart Sender platform employs a 'push' factor to engage the people in the conversion and maintain it with chatbots and messengers. It provides a non-professional computer user with the tools to build any type of conversation or interaction scenario. It is equipped with analytical tools such as an open rate and Click-through rate (CTR) ones to monitor the engagement and based on them make amendments to the above scenario. Moreover, marketing tools such as Chatbots are gradually incorporated into online education to simulate interaction, keep students on track in their learning process, and encourage them to succeed in the course (Colace et al., 2018; Zhidkoff, 2020). This technology-driven instructional

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challenge inspired the study and created the gap for the attempt to use the Smart Sender platform as a way to increase the learning engagement of students.

Literature review

In literature, smart learning is associated with improving students' understanding and performance through the interplay of flexible pedagogy and technology making it student-centric (student-customised), digital, and collaborative (Huang et al., 2020). The flexible pedagogy that creates the theoretical framework for the study, relies on both students' freedom of choice concerning the learning strategies, pace, place, mode of learning and technology-mediated/enhanced learning (Gordon, 2014). It was also found that a student-customised approach to teaching languages, which is ensured by smart automated teaching, develops students' autonomy, enhances their cognitive processing speed, motivation, and language skills (Kurnaz et al., 2020; Santipolo, 2017; Shykhnenko & Nozhovnik, 2020). The use of technology in the smart learning instructional model prepares the students to act in the digital economy through adapting to its settings, sensing changes and impacts, and self-sustaining in a focused manner (Bonnaud, 2019).

It was found that SMART, in the context of technology, stands for self-directed (S), motivating (M), adaptive (A), resource-enriched (R), technology-embedded (T) learning environment (Budhrani et al., 2018). Self-directedness is enabled through just-in-time and in the right form teaching/learning approach based on the individual needs of a learner. A smart learning system uses personalised guidance to help learners meet their learning goals. The motivation effect is achieved when the learner tracks and assesses their learning progress based on feedback or hints. The adaptivity is ensured through the combined use of mobile applications, social media, online communities (blogs), web-based tools, and resources to create that kind of environment that can be accessed through smart devices such as Facebook, Instagram, Edmodo, TED Conferences, Moodle, Coursera, EdX, and others. The resource-enriched nature of smart technology addresses individual interests through creating the knowledge database and information-sharing infrastructure. The technology-embedded learning environment creates learning experiences similar to conventional learning mode.

Son (2018) emphasises that smart learning is also well integrated into conventional learning. Kasperiūnienė and Daukilas (2018) opine that the use of smart technology (ST) in education, specifically messengers and chatbots, is trendy because ST is compatible with the way the emerging generation communicates and interacts, and it complies with principles of creating the educational environment such as flexibility, free access, student-centeredness and - tailoredness, integratedness, and interactiveness. Kaur (2018) reasons that ST creates a comfortable learning environment for the learner and makes one focus on the learning goals more than on learning how to use new software.

Undeniably, using smart technology positively influences teaching and learning foreign languages when target language resources are used to train language skills (Altun, 2015). Altun (2015) states that a smartphone is the most widely used device which makes it a natural learning environment for students. Interestingly, Altun (2015) and Jesus and Herrera (2020) found that interviewed students responded that they preferred learning language through technology (mobile devices) to their conventional university offline English classes because devices seemed more motivating for them in terms of target language-based communication, reading, listening and writing.

Given the above, ST brings dual benefits such as higher satisfaction and spending less time on obtaining the result. The reasons to incorporate ST in language teaching are to encourage communication both face-to-face and online and to develop the students' skills of self-paced (autonomous) learning. ST is seen as a good alternative to Moodle because the former provides more tools to develop language skills such as natural language processing for speaking and listening, editing tools (Grammarly.com) for writing, authentic materials for reading compared to the latter which is becoming outdated. The automated delivery of lessons seems one more advantage of ST as it can use the 'push' factor to stimulate students' learning.

Though the use of smart technology in foreign language teaching is sufficiently presented, it was found a loophole in the use of the marketing tools that are designed to establish relations and increase engagement of the customers for instructional purposes to deal with the drawbacks of distance learning at universities. Those key disadvantages of the distance learning that relies on Moodle™ or other Learning Management Systems used at universities are insufficient students' motivation (or self-motivation, as seen from the teachers' perspective), poor time management skills, and cognitive processing speed (Bobrytska et al., 2020; Gilbert, 2015). The students explain those issues by blaming a linear fashion of the courses for little or no involvement from a teacher, exceeded load pressure, and drill-purpose nature of the activities (Armstrong-Mensah et al., 2020; Burke, 2020).

Therefore, the *purpose* of this research was to identify whether the English language e-classes that are automated and delivered through the Smart Sender platform influence the students' motivation, time management skills, cognitive processing speed, and satisfaction.

The research questions were as follows: 1) how the automated delivery of the English language e-classes effects students' motivation, time management skills, cognitive processing speed, and satisfaction; 2) how students perceive the automated delivery-based approach to language teaching.

The research hypotheses were as follows:

H_0: The automated delivery of the English language e-classes will have no effect on the students' motivation, time management skills, cognitive processing speed, and satisfaction.

H_1: The automated delivery of the English language e-classes will have an effect on the students' motivation, time management skills, cognitive processing speed, and satisfaction.

Methodology

The study was mixed-method research in which the qualitative methods were *complementary* to quantitative methods (Schoonenboom & Johnson, 2017). The experimental group students' attendance and procrastination rates, their motivation and engagement, time management skills, cognitive processing speed, and satisfaction were chosen to be the dependent variables. The data were yielded from attendance and procrastination statistics, the questionnaire on learning motivation, engagement, and competence (adopted from Kubischta, 2014), the Time Management Skills Test (Psychology Today, 2020b), the Mental Speed Test (MST) (Version 1) (Psychology Today, 2020a), the course satisfaction questionnaire, and a focus group discussion.

Research design

The research was a quasi-experiment of the pre-test- post-test non-equivalent control group design (Price et al., 2015). It was conducted as a flow of five basic phases such as the research concept development (conceptual) phase, research design (pre-experimental) phase, experimental phase, data processing phase, and the phase of dissemination. In the research concept development phase, the scope and feasibility of the study were identified. The research design phase was dedicated to the reshaping of the delivery (automation) of 10 English Language Classes using the Smart Sender platform, collection of the instruments to measure the variables, development of the research and sampling plan, and obtaining approval from the Panel of five experts in Pedagogics, Language Teaching and Technology. During the experimental phase, the students of the experimental group were delivered the English language classed automatically, and the students of the control group were involved in the conventional distance classes delivered through the Moodle platform. The pretest and posttest measurements were also administered in this phase. These were followed by the data analysis. In the data processing phase, the output data were analysed using statistical methods which were proceeded by interpretation of the results. In the disseminative phase, the training in the methodology of the design of the automatically delivered English language lessons was performed to the representatives of the other universities.
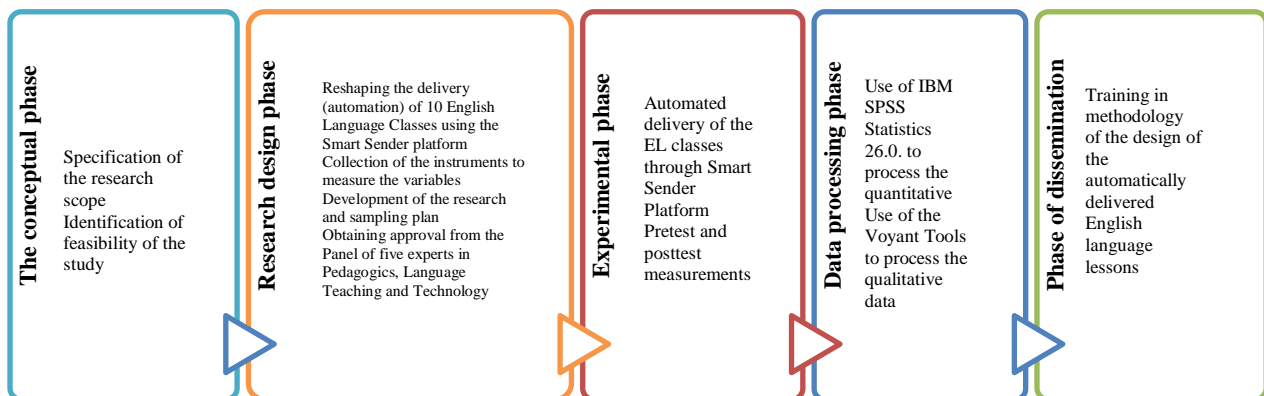

Figure 1: Five phases-based research design

Description of the intervention based on the automated delivery of the English language e-classes

IMPORTANT! Try out the DEMO LESSON through the link https://glabal.customer.smartsender.eu/lp/tMn1TDvQ before you continue reading the section (the purposefully programmed timing is about 5 min.)

The automated delivery of the English language e-classes was carried out using the Smart Sender platform, Viber Bot, Telegram Bot, Telegram Quiz Bot, Google Forms, and Cisco Webex web conferencing application. A free trial was used to design 10 lessons (2 lessons per each research member account).

The length of the class was programmed to 120 minutes. The IELTS examination timing requirements were used to allocate time for the 'class' and research activities. The content and structure of the coursebook entitled "English for Globalisation Awareness" (Nozhovnik, 2015) was adjusted to fit the purpose of the study and the curriculum used in each institution. The topic of globalisation was found to be suitable both professionally and academically for the sampled students in terms of their majors. The topics of 10 classes are presented in Table 1.

Table 1: The structure of the course by topics

# class	Topic	English language skills			Academic skills
		Listening	Reading and Speaking	Writing	
1	Going Global	Video: Globalisation: Some History Issues		Home assignment: Writing a Report & Speaking	Writing a Bibliography
2			Global Village		
3		Progress check 1			
4	Ins and Outs of Globalisation		a) The Dimensions of Globalisation b) The Causes of Globalisation c) The Resulting Problems of Globalisation	Home assignment: Writing an Essay & Speaking	Paraphrasing
5		a) Video: Education and Globalisation b) Video: A Brief History of Globalism and 'global governance'			
		Progress check 2			
6	The European Union: Local Sample of Globalisation	a) Video: EMN News TV 2nd Broadcast – Maastricht Treaty b) Video: Establishing a Single Market Video: The EU		Writing an Essay & Speaking	Summarising
7			How accession to the EU works		
8			Discussion: Ukraine's Prospects of Becoming a Member of the EU		Writing an Annotation
9		Progress Check 3			
10		Module test			

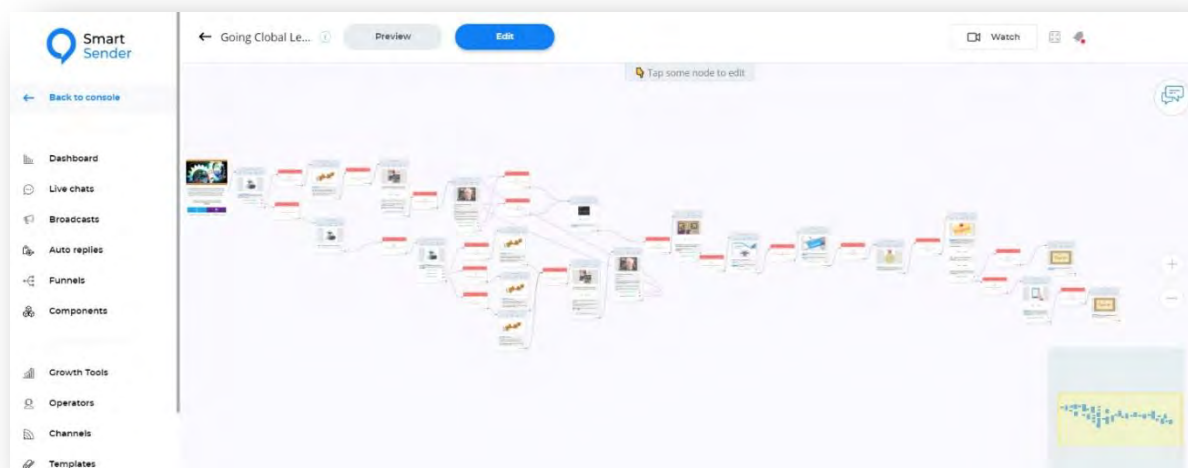The visualised scheme of the demo lesson is presented in Figure 2.

Figure 2: Visualised Scheme of the Demo Lesson

Sample

Two sampling techniques such as random sampling and convenience sampling were used to form the experimental group (EG) and the control group (CG), respectively. The EG and CG were selected from the population of 267 third-year undergraduates for three universities in Ukraine such as the National University of Life and Environmental Sciences of Ukraine (NULESU), Kyiv National Economic University named after Vadym Hetman (KNEU), and the State University of Infrastructure and Technologies (SUIT). The statistically significant sample size was computed and found that the optimal representative sample size was 76 people given that the confidence level was 90% and the margin of error was 8%. The sample size number of 76 students was used to form the EG and CG. The EG consisted of 38 people (19 males aged 20-21 and 19 females aged 20-21) and the CG also consisted of 38 students (12 males aged 20-21 and 26 females aged 20-22). The key criteria for selecting the students to participate in the EG were as follows: a low rate of attendance and a high rate of procrastination whose statistics were obtained through the institutional managers who are in charge of the maintenance of the distance learning process. The demographic characteristics of the EG and CG students are presented in Table 1.

Table 1. Demographic characteristics of the EG and CG students

| Group | Characteristics | Institution | | | Mean | SD |
		NULESU, n (%)	KNEU, n (%)	SUIT, n (%)		
EG, ($n = 38$)	Males, n_{pooled}=19	7 (18.42)	6 (15.79)	6 (15.79)	6.33	0.47
	Females, n_{pooled}=19	7 (18.42)	6 (15.79)	6 (15.79)	6.33	0.47
CG, ($n = 38$)	Males, n_{pooled}=12	4 (10.52)	4 (10.52)	4 (10.52)	4.00	0.00
	Females, n_{pooled}=26	9 (23.68)	9 (23.68)	8 (21.08)	8.66	0.47
EG, ($n = 38$)	Philology	14 (36.84)	0	0	4.66	6.59
	International Business	0	12 (31.58)	0	4.00	5.65
	Law	0	0	12 (31.58)	4.00	5.65
CG, ($n = 38$)	Philology	13 (34.21)	0	0	4.33	6.12
	International Business	0	13 (34.21)	0	4.33	6.12
	Law	0	0	12 (31.57)	4.00	5.65
Mean grades (ECTS, 100-point scale)		73–75	71–75	72–76	73.64	1.42

Instruments

Five instruments were utilised to draw the statistical data from the measurements. These were as follows: the questionnaire on Learning Motivation, Engagement, and Competence (LMEC), the Time Management Skills Test (TMST), the Mental Speed Test (MST) (Version 1), and the course satisfaction questionnaire. The focus group discussion questionnaire (guiding questions) was used to obtain verbal feedback from the participants.

Questionnaire on Learning Motivation, Engagement and Competence (LMEC) (adopted from Kubischta, 2014 and adapted to fit the English language teaching context)

It is a three-section questionnaire that combines three scales such as the Revised Two Factor Study Process Questionnaire (R-SPQ-2F) (Biggs et al., 2001), the Student Engagement (SE) (Ahlfeldt et al. 2005), and the Motivated Strategies for Learning Questionnaire (MLSQ) (Kim, 2014; Pintrich & De Groot 1990). The first section of the questionnaire consists of 20 items making two scales such as the Deep approach and the Surface approach. This section relies on a 5-point Likert scale with values 1 = "Never true for me" up to 5 = "Always true of me." The second section entitled Student engagement consists of two sets of 5 items comprising the constructs such as a cognitive level and personal skills. This section uses a 4-point scale with the values ranging from 1 = "Very little" to 4 = "Very much". The thirds section comprises 39 items measuring the respondents' self-efficacy, their intrinsic value, test anxiety, the use of the cognitive strategy, and the ones' self-regulation skills. This scale uses a 7-point Likert scale based on the values from 1 = "Not at all true for me" to 7 = "Very true for me".

Time Management Skills Test (TMST)

The test comprises 23 questions using a 5-point frequency scale with 1 = "Almost Never" to 5 = "Quite Often" to show how habitually or to what degree the respondents agree with the statement. It is supposed to take 10 minutes to respond to all questions and provides an instant interpretation of the results using a 100-point scale.

Mental Speed Test (MST)

There 41 questions in the test and each question use the tasks based on pairs of words vs images, mathematical equations, or number sequences. It uses a binary scale based on "Correct" or "Incorrect" options to make judgements. The students were supposed to take 5 minutes to fulfil it. The results are interpreted using a 100-point scale.

Course Satisfaction Questionnaire (CSQ) (Appendix A)

The questionnaire consists of 6 questions. It is based on two 7-point Likert scales such as a usefulness scale and a satisfaction scale. The values for the usefulness scale were as follows: 1= Absolutely Useless; 2 = Very Useless; 3 = Moderately Useless; 4 = Neutral; 5 = Slightly Useful; 6 = Moderately Useful; 7 = Absolutely Useful. The values for the satisfaction scale were as follows: 1= Extremely Dissatisfied; 2 = Moderately Dissatisfied; 3 = Slightly Dissatisfied; 4 = Neutral; 5 = Slightly Satisfied; 6 = Moderately Satisfied; 7 = Extremely Satisfied.

Focus group discussion guiding questions (n = 12)

The discussion involved 12 randomly selected students of the EG. It lasted 40 minutes and was moderated and facilitated by the research team members. The discussion relied on 6 open-ended questions and was run to comply with four basic phases such as opening → warm-up → discussion → wrap-up.

Questions

1. What are your attitudes towards automation of the delivery of the English Language classes? Why?

2. What drove your positive or negative attitude? In case your attitude is negative, how could it be changed or rectified?

3. What do you think the aims of automation of the delivery of the English language classes were?

4. Do you think automation is likely to improve the students' learning outcomes quality of language learning?

5. What were the issues or barriers that you had experienced around actually doing the English language classes delivered through the Smart Sender? Do you think you need additional training?

6. How could it be made more student-friendly and easier to use?

Data analysis

The quantitative data were yielded from the questionnaire on Learning Motivation, Engagement, and Competence (LMEC), time management skills test (TMST), mental speed test (MST), and course satisfaction questionnaire (CSQ). The qualitative data were drawn from the focus group discussion. The first three quantitative tools were used to monitor how the automated delivery of the English language e-classes effected the EG students' attendance and procrastination rates, motivation, time management skills, and cognitive processing speed. The course satisfaction questionnaire and focus group discussion were utilised to monitor the EG students' perceptions of the automated delivery-based instructional model. The LMEC questionnaire was aimed to measure the students' attitudes to currently run distance learning process, their attitudes to the content of the English Language distance course, and to identify the students' behaviours in the current learning process. The instrument was proved reliable with values of the Cronbach alpha were 0.73 for a deep approach construct and 0.64 for a surface approach construct for the R-SPQ-2F reliability which was acceptable (Biggs et al., 2001). The reliability value of the Cronbach alpha was 0.84 for the SE component which was sufficient according to Ahlfeldt et al. (2005). The MSLQ values for the Cronbach alpha reliability were as follows: 0.89 for self-efficacy, 0.87 for the intrinsic value, 0.83 for the respondents' cognitive strategy, and 0.74 for self-regulation (Kim, 2014; Pintrich & De Groot 1990). Additionally, Kim (2014) also found that the MLSQ scores for academic self-efficacy of .93 were the indicators of reliability. The Cronbach's α for the R-SPQ-2F was 0.78 for the EG and 0.76 for the CG. The Cronbach's α for the SE was 0.84 for both EG and CG. The Cronbach's α for the MLSQ was between 0.74 and 0.89 for the EG and between 0.75 and 0.86 for CG.

The time management skills test was used to monitor whether the students manage to deal with meeting deadlines or procrastination which found the key issues in distance learning. The test was found reliable by the Panel of Experts. The MST assessed the speed of information processing and decision-making before and after the treatment in the EG. The test was found reliable by the Panel of Experts. Both course satisfaction questionnaire and focus group discussion were used to answer the third research question. Both tools were used to monitor the EG students' overall impression of the delivery mode, the structure design of the classes, the content of the classes, the approach to managing the participants the chatbot-based approach to assess the assignments, and the respondents' intellectual change brought by the delivery mode. It was administered to the participants online. The questionnaire inter-rater reliability was validated by the Panel of experts as recommended by Rodrigues et al. (2017). Inter-rater agreements ranged between 77.8% and 95.54%. The results were automatically consolidated by the Google form in Google Drive and then converted into an Excel file. Statistical software such as Jamovi (Version 1.6) and the Voyant Tools was employed to

analyse the consolidated numerical and textual information. The common method bias was addressed as recommended by Podsakoff (2012), i.e. through intermixing the items of different constructs on the scales.

Results

The study rejected the H_0 hypothesis and found that the automated delivery of the English language e-classes positively effects students' motivation, time management skills, cognitive processing speed, and satisfaction. Additionally, the delivery was generally appreciated by the students. The findings were proved by the pre-test- post-test measurements and supported by the students' feedback drawn from the focus group discussion and the course satisfaction questionnaire.

Results of pre-test- post-test measurements based on the Paired Sample t-test

The paired sample *t*-test was administered to monitor the variables. The measurements are based on the consolidated mean values drawn from the Questionnaire on Learning Motivation, Engagement and Competence (LMEC), the Time Management Skills Test (TMST), and the Mental Speed Test (MST). Table 2 presents the results of measurements drawn from the LMEC.

Table 2: Results of pre-test- post-test measurements drawn from the Questionnaire on Learning Motivation using the Paired Sample t-test

Group	Mean		SD		t	df	p	Mean difference	SE difference
	Before	After	Before	After					
EG	4.28	4.92	1.031	0.611	–3.93	37.0	<.001	–0.639	0.163
CG	4.16	4.47	0.526	0.441	–8.30	37.0	<.001	–0.303	0.0365

As can be seen in Table 2, both EG and CG students experienced a change in learning motivation and engagement. However, the values for Mean difference imply that the change in the EG students was substantially greater ($EG_{Mean\ difference}$ = –0.639, $SE_{difference}$ = 0.163 and $CG_{mean\ difference}$ = –0.303, $SE_{difference}$ = 0.0365).

Table 3 provides the results of measurements yielded from the Time Management Skills Test.

Table 3: Results of pre-test- post-test measurements drawn from the Time Management Skills Test using the Paired Sample t-test

Group	Mean		SD		t	df	p	Mean difference	SE difference
	Before	After	Before	After					
EG	48.9	66.8	7.05	6.34	–12.6	37.0	<.001	–17.9	1.42
CG	52.2	53.6	5.49	5.36	–9.85	37.0	<.001	–1.42	0.144

As indicated in Table 3, the EG students improved their time management skills with a value of –17.9 for the Mean difference and 1.42 for the SE difference.

Table 4 provides the results of calculations obtained from the Mental Speed Test.

Table 4: Results of pre-test - post-test measurements drawn from the Mental Speed Test using the Paired Sample t-test

Group	Mean		SD		t	df	p	Mean difference	SE difference
	Before	After	Before	After					
EG	37.6	62.2	4.48	6.47	–25.8	37.0	<.001	–24.6	0.950
CG	38.9	44.7	5.90	5.35	–9.31	37.0	<.001	–5.76	0.619

As shown in Table 4, the EG students succeeded more in the Mental Speed Test (Mean difference = – 24,6, SE difference = 0.950), compared to the CG students whose values for Mean difference were much lower (Mean difference = – 24,6, SE difference = 0.619).

Overall, the difference in the three tests indicated that EG students' values for motivation and engagement, time management skills, cognitive processing (mental processing) speed showed a more significant increase than those in the CG students.

Besides the changes that occurred in the EG students' motivation, time management, and mental speed, there were observed positive changes in their attendance, and procrastination rates which were used in the study as complementary indicators. Both attendance and procrastination rates were measured using the Smart Sender embedded statistical tools such as the Open Rate and the CTR (Click-through rate) for attendance and the number of

reminder messages sent by the chatbot to the students before the activity and before the submission of the assignments. The total number of reminder messages was between 15 and 27 per class. The changes in indicators that took place throughout the course are presented in Table 5.

Table 5: Changes in indicators throughout the course

Indicator	Classes									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Open Rate (%)	37	49	54	61	88	73	86	91	100	100
CTR (%)	21	33	39	58	62	63	74	76	84	87
Reminder messages ($n_{per\ class}$)	25	24	21	16	13	8	7	5	5	2

The values for the Open Rate and CTR in Table 5 implied that the students' 'attendance' improved from class to class the course. The number of reminder messages that gradually decreased throughout the course suggested that the chatbot addressed the issues with the EG students' procrastination.

The Course Satisfaction Survey ($n = 38$)

The survey was administered to the EG students online and was intended to obtain feedback on the usefulness and satisfaction of the students with the automated delivery of the English language e-classes. The results are presented in Table 6.

Table 6: Results of the course satisfaction survey

Usefulness scale				# question	Satisfaction scale			
Median	SD	σ^2	*Margin of error		Median	SD	σ^2	Margin of error
6	7.40	54.77	5.2857±5.483 (±103.73%)	Q1	7	5.90	34.81	5.4286±4.371 (±80.52%)
7	4.98	24.81	5.4286±3.69 (±67.98%)	Q2	6	6.32	39.95	5.4286±4.683 (±86.26%)
4	5.52	30.53	5.4286±4.093 (±75.40%)	Q3	4	7.97	63.67	5.4286±5.911 (±108.89%)
7	5.04	36.53	5.4286±3.69 (±67.98%)	Q4	6	6.41	41.10	5.4286±4.749 (±87.49%)
3	6.63	43.95	5.4286±4.912 (±90.48%)	Q5	3	8.27	68.53	5.4286±6.133 (±112.97%)
5	7.30	53.42	6±5.415 (±90.25%)	Q6	4	6.18	38.24	5.4286±4.581 (±84.39%)

Note: σ^2- Variance; *Significant at a confidence level of 95%.

As can be seen in Table 6, the Median data screwed right for Q1 and Q4 (Satisfaction scale) meaning that the students found the structure of the classes and approach to managing the learning process the most useful ($Med. = 7$; $SD = 4.98$ and $SD = 5.04$, respectively). The respondents' overall impression of the delivery mode and their perception of the intellectual change that occurred to them due to the language lessons delivery in terms of usefulness were also complimentary. With regard to satisfaction, the Median data screwed right for Q1, Q2, and Q6 (Satisfaction scale) that meant the EG students appreciated the course, its structure, and instructional management ($Med. = 7, SD = 5.90$; $Med. = 6, SD = 6.32$; $Med. = 6, SD = 6.41$).

Results of the focus group discussion ($n = 12$)

In the analyses of the corpus of the students' responses to the first question using the Voyant Tools, it was found that the most frequently used words were as follows: experience, enjoyed, learning, courses, interesting, and new (see Fig. 3).

Figure 3: The most frequently used words in the students' responses identified by the Voyant Tools

The most frequent collocations identified by the Voyant Tools were as follows: enjoyed learning, interesting learning, new experience, encouraged learning. The correlations between the above terms were also analysed using the Voyant Tools. The results of the correlation analysis are presented in Table 7.

Table 7: The results of the correlation analysis between the words in most frequent collocations

Term 1		Term 2	Correlation*	Significance**
enjoyed	←→	learning	1	0
interesting	←→	learning	1	0
new	←→	experience	0.8291	0.00301
encouraged	←→	learning	0.7778	0.02114
lessons	←→	interesting	0.7449	0.03892

Note: *values that are greater than 0.7 indicate strong correlation; **the correlation is the significance and strong if the value is .05 or less.

The students' quotes were as follows:

[… it was like a game or entertainment with a difficulty increasing at every step…]

[…it was a new experience of learning for me and my mates as I was pushed to learn and was focused on learning…]

[…it was hilarious as ever … I would like all my classes were like those …]

Question 2. All students reported that both their attitude and experience were complimentary as they were kept on learning track and navigated by the chatbot. The content met their expectations, professional needs, and trained their English language skills.

Question 3. Three students thought the reasons for automation of the delivery were financial. Three other students suggested that the reason was to release teachers' capacity that could be used to design and update materials. Six students supposed that it had been to try a new method of language teaching.

Question 4. Eight students were sure that the delivery approach increases learning motivation and influences the quality of language learning. Four students reported that this way of language training had changed their learning behaviour and strategies which they considered the improvements of the quality learning outcomes.

Question 5. Nine students mentioned that the greatest challenge to them was timing. In the beginning, they often failed to meet the deadlines. Three students confessed that they would like more human interaction, though. Concerning additional training, they did not need any as they regularly used the messengers.

Question 6. The most common students' suggestions were as follows: a) the curriculum could be more flexible; b) the lesson design could be reshaped to fit the students' learning styles; c) the more frequent use of emosies could make the instructions more social.

Discussion

The novelty of the study lies in the use of a marketing tool that employs a 'push' factor to increase engagement with chatbots for the instructional purpose, specifically for English Language teaching to students majoring in Philology, International Business, and Law. It was intended to identify whether the English language e-classes that are automated and delivered through the Smart Sender platform influence the students' attendance and procrastination rates, their motivation, time management skills, and satisfaction. The latter was addressed through answering two research questions such as how the automated delivery of the English language e-classes had effected students' motivation, time management skills, and satisfaction, and how students had perceived the automated delivery-based approach to language teaching. The quantitative findings showed that the EG students experienced a positive change in attendance, motivation and learning engagement, time management skills, and thinking speed due to the intervention. Results of pre-test- post-test measurements drawn from the Questionnaire on Learning Motivation using the Paired Sample *t*-test showed that the students experienced a substantial change in attendance, motivation, and learning engagement ($EG_{Mean\ difference}$ = −0.639, $SE_{difference}$ = 0.163 compared to the $CG_{mean\ difference}$ = −0.303, $SE_{difference}$ = 0.0365). It was found that the EG students improved their time management skills which have been proved by values for Mean difference of −17.9 and SE difference of 1.42. Furthermore, the EG students succeeded more in the Mental Speed Test (Mean difference = − 24,6, SE difference = 0.950), compared to the CG students whose values for Mean difference were much lower (Mean difference = − 24,6, SE difference = 0.619). When responding to the questions from the course satisfaction survey, the Median data screwed right for Q1 and Q4 (Satisfaction scale) meaning that the students found the structure of the classes and approach to managing the learning process the most useful ($Med.$ = 7; SD = 4.98 and SD = 5.04, respectively). The respondents' overall impression of the delivery mode and their perception of the intellectual change that occurred to them due to the language lessons delivery in terms of usefulness were also complimentary. With regard to satisfaction, the Median data screwed right for Q1, Q2, and Q6 (Satisfaction scale) that

meant the EG students appreciated the course, its structure, and instructional management ($Med. = 7, SD = 5.90$; $Med. = 6, SD = 6.32$; $Med. = 6, SD = 6.41$). The values for the Open Rate and CTR used as complementary indicators implied that the students' 'attendance' improved from class to class the course. The number of reminder messages that gradually decreased throughout the course suggested that the chatbot addressed the issues with the EG students' procrastination.

The Voyant Tools-based analyses of the corpus of the students' responses obtained from the focus group discussion found that the EG students described their learning experience positively and the most frequently used words were as follows: experience, enjoyed, learning, courses, interesting, and new. The most frequent collocations were as follows: enjoyed learning, interesting learning, new experience, encouraged learning. The EG students stated that the content met their expectations, professional needs, and trained their English language skills. The participants told that the delivery approach increased their learning motivation and contributed to the quality of language learning. They reported that this way of language training had changed their learning behaviour and strategies which they considered the improvements of the quality learning outcomes.

The findings are consistent with previous research. These agree with the implications of Sari and Nurcahyo (2018) who also found that the instructional use the mobile learning had significantly improved students' learning motivation (α of 0.00, p <0.05 with the N-gain score of 0.64) and was capable to reduce the procrastination rates. It aligns with the findings of Jeno et al. (2019) who established that mobile-based learning raises intrinsic motivation based on optimal challenges. The study agrees with Kacetl and Klímová (2019) in terms of benefits such as boosting learner's cognitive capacity, promoting student-tailored learning/teaching, and helping low-achieving students to succeed in their studies. The findings are consistent with Forteza and Pastor (2014) who concluded that the virtual technology-mediated learning environment could be regarded as a multipurpose tool able to support different styles of learning/teaching. The findings of the study agree with the concepts of Computer Assisted Language Learning and Mobile Learning (the 'Bring Your Own Device' (BYOD) movement) (Kohne et al., 2015; Talmo et al., 2014). These introduced a paradigm shift in education providing new instructional methods of student engagement and collaboration. The results go in line with Mofareh (2019) and Son (2018) who reveal that the use of smart technology diversifies the curriculum, equips instructors with a greater number of teaching tools that maximise outcomes of language learning. The study agrees with the implications provided by Khoshsima et al. (2018) and Abu-Ayfah (2020) who found that the use the apps such as Telegram, WhatsApp, Skype positively influences students' motivation and interests in learning foreign languages and are positively perceived by the students.

Conclusion

The Smart Sender platform has proved effective as an instructional tool for teaching the English Language to students majoring in Philology, International Business, and Law. The use of it for instructional purposes also contributed to the quality of language learning. The automated delivery of the English language e-classes is also effective in addressing the issues of dropouts and procrastination in distance learning through automation of the lesson delivery based on the 'push' factor. It increases students' motivation, improves time management skills, and satisfaction. The quantitative findings showed that the EG students experienced a positive change in motivation and learning engagement, time management skills, and thinking speed due to the intervention. The students perceived the automated delivery-based approach to language teaching positively. The EG students reported that the delivery approach content met the participants' expectations and needs. Focus group discussion revealed that the intervention changed their learning behaviour and strategies which were considered the improvements of the quality learning outcomes.

Recommendations

The instructors should consider the Smart Sender as a substitute or an alternative to the Moodle platform because the Smart Sender is much easier for the lesson design as it uses ready blocks which are just combined for the specific learning purpose. The instructors are recommended to get a short training in programming the tool. Before designing the whole course, they should prepare a duplicable template (this function is available) of the lesson which then is filled with the previously prepared materials. Having that ready, they will spend 3-4 hours for a lesson to design.

The researchers should study whether automated delivery can be applied to teaching other academic disciplines and what apps can be combined to design a comprehensive teaching tool. They should also study how the use of the Smart Sender platform effects the students' learning motivation and engagement in the settings of the blended learning model.

Limitations

The limitations of this study are related to a limited number of prior relevant research studies on the use of marketing tools for instructional purposes in language training to address the issues of poor attendance of the online classes at universities. The self-reported data drawn for the survey and focus group discussion can also be considered a limitation as these cannot be independently verified (Price & Murnan, 2004).

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Conflicts of Interest

The authors report no conflicts of legal, financial, or commercial interests related to the research.

References

Altun, M. (2015). The integration of technology into foreign language teaching. *International Journal on New Trends in Education and Their Implications, 6*(1), 22-27.

Abu-Ayfah, Z. A. (2020). Telegram app in learning English: EFL students' perceptions. *English Language Teaching, 13*(1), 51-62. https://doi.org/10.5539/elt.v13n1p51

Ahlfeldt, S., Mehta, S., & Sellnow, T. (2005). Measurement and analysis of student engagement in university classes where varying levels of PBL methods of instruction are in use. *Higher Education Research & Development, 24*(1), 5-20. https://doi.org/10.1080/0729436052000318541

Armstrong-Mensah, E., Ramsey-White, K., Yankey, B., & Self-Brown, S. (2020). COVID-19 and Distance learning: Effects on Georgia State University School of Public Health students. *Frontiers in Public Health, 8,* 1-10. https://doi.org/10.3389/fpubh.2020.576227

Biggs, J. B., Kember, D., & Leung, D. Y. P. (2001). The revised two-factor study process questionnaire: R-SPQ-2F. *British Journal of Educational Psychology, 71*(1), 133-149. https://doi.org/10.1348/000709901158433

Bobrytska, V. I., Reva, T. D., Protska, S. M., & Chkhalo, O. M. (2020). Effectiveness and stakeholders' perceptions of the integration of automated e-learning courses into vocational education programmes in universities in Ukraine. *International Journal of Learning, Teaching and Educational Research, 19*(5), 27-46. https://doi.org/10.26803/ijlter.19.5.3

Bonnaud, O. (2019). New vision in microelectronics education: Smart e-learning and know-how, A Complementary approach. In V. Uskov, R. Howlett, L. Jain & L. Vlacic (Eds.), *Smart Education and e-Learning 2018, Smart Innovation, Systems and Technologies, 99*. Springer. https://doi.org/10.1007/978-3-319-92363-5_25

Budhrani, K., Ji, Y., & Lim, J. H. (2018). Unpacking conceptual elements of smart learning in the Korean scholarly discourse. *Smart Learning Environments, 5*(23), 1-26. https://doi.org/10.1186/s40561-018-0069-7

Burke, L. (2020). *Moving into the long term.* Inside Higher Ed. https://www.insidehighered.com/digital-learning/article/2020/10/27/long-term-online-learning-pandemic-may-impact-students-well

Cambridge ALTA. (2020). *Research in computer systems and platforms, corpus linguistics, computational linguistics, speech processing, and machine learning*. http://alta.cambridgeenglish.org/

Colace, F., Santo, M., Lombardi, M., Pascale, F., Pietrosanto, A., & Lemma, S. (2018). Chatbot for e-learning: A case of study. *International Journal of Mechanical Engineering and Robotics Research*, *7*(5), 528-533. https://doi.org/10.18178/ijmerr.7.5.528-533

Ergin, H., & Morche, B. (2018). *Internationalisation of HE through distance learning.* University World News. https://www.universityworldnews.com/post.php?story=20180509084648106

Forteza, F. R., & Pastor, M. L. C. (2014). Virtual language learning environments: the standardization of evaluation. *Multidisciplinary Journal for Education Social and Technological Sciences, 1*(1), 135-152. https://doi.org/10.4995/muse.2014.2199

Gilbert, B. (2015). *Online learning: revealing the benefits and challenges* [Masters' thesis, St. John Fisher College]. Fisher Digital Publications. https://core.ac.uk/download/pdf/48619313.pdf

Gregori, P., Martínez, V., & Moyano-Fernández, J. J. (2018). Basic actions to reduce dropout rates in distance learning. *Evaluation and Program planning, 66,* 48-52. https://doi.org/10.1016/j.evalprogplan.2017.10.004

Gordon, N. A. (2014). *Flexible Pedagogies: Technology-enhanced learning.* The Higher Education Academy. https://doi.org/10.13140/2.1.2052.5760

Huang, R. H., Liu, D. J., Tlili, A., Yang, J. F., Wang, H. H., Berrada, K., Burgos, D., Chan, C., Chen, N.-S., Cui, W., Dahdahjani, S., Grosseck, G., Holotescu, C., Hu, X., Jemn, M., Khribi, K., Kinshuk, Liang, J., Lee, O., Looi, C.-K., Nascimbeni, F., Spector, J. M., & Zhao, J. (2020). *Handbook on Facilitating Flexible Learning During Educational Disruption: The Chinese Experience in Maintaining Undisrupted Learning in COVID-19 Outbreak.* Smart Learning Institute of Beijing Normal University. http://iasle.net/wp-content/uploads/2020/03/Handbook_Facilitating_Flexible_Learning.pdf

Jeno, L. M., Adachi, P. J. C., Grytnes, J.-A., Vandvik, V., & Deci, E. L. (2019). The effects of m-learning on motivation, achievement, and well-being: A self-determination theory approach. *British Journal of Educational Technology, 50*(2), 669-683. https://doi.org/10.1111/bjet.12657

Jesus E., & Herrera, H. (2020). *Emerging & mobile technologies in foreign language learning.* Harvard University. https://scholar.harvard.edu/eherrera/blog/emerging-mobile-technologies-foreign-language-learning

Kacetl, J., & Klímová, B. (2019). Use of smartphone applications in English language learning—A Challenge for foreign language education. *Education Sciences, 9*(3), 179-188. https://doi.org/10.3390/educsci9030179

Kasperiūnienė, J., & Daukilas, S. (2018). Smart educational technology in the learning process at a rural vocational training institution - A Case study. In A. Raupelienė (Ed.), *Proceedings of International Scientific Conference "Rural Development 2017"* (pp. 1-5). Aleksandras Stulginskis University. https://doi.org/10.15544/rd.2017.128

Kaur, D. (2018). *How smart class technology is benefiting the education sector.* Entrepreneur. https://www.entrepreneur.com/article/322587

Kim, M. (2014). *Motivated strategies for learning questionnaire-adapted version (MSLQ)* [Database record]. APA PsycTests. https://doi.org/10.1037/t61505-000

Kohne, A., Ringleb, S., & Yücel, C. (2015). *Bring your own device.* Springer Vieweg. https://doi.org/10.1007/978-3-658-03717-8

Kotsiantis, S. B., Pierrakeas, C. J., & Pintelas, P. E. (2003). Preventing student dropout in distance learning using machine learning techniques. In V. Palade, R. J. Howlett & L. Jain (Eds.), *Knowledge-Based Intelligent Information and Engineering Systems*, Springer. https://doi.org/10.1007/978-3-540-45226-3_37

Khoshsima, H., Saed, A., & Arbabi, M. (2018). Online teachers' attitudes toward using technology in teaching English as a foreign language. *Journal of Applied Linguistics and Language Research, 5*(2), 134-148.

Kubischta, F. (2014). *Engagement and motivation: Questioning students on study motivation, engagement, and study strategies* [Bachelor's thesis, Haaga-Helia University of Applied Sciences]. Haaga-Helia University Digital Archive. https://core.ac.uk/download/pdf/38108637.pdf

Kurnaz, A., Arslantas, S., & Pursun, T. (2020). Investigation of the effectiveness of personalized book advice smart application on secondary school students' reading motivation. *International Journal of Educational Methodology, 6*(3), 587-602. https://doi.org/10.12973/ijem.6.3.587

Mofareh, A. A. (2019). The use of technology in English language teaching. *Frontiers in Education Technology, 2*(3), 168-180. https://doi.org/10.22158/fet.v2n3p168

Nozhovnik, O. M. (2015). *Angliiska dlia rosuminnia hlobalisatisii* [English for globalisation awareness]. Publishing House for "KROK" University of Economics and Law /Vydavnytstvo Universytetu Ekonomiky ta Prava "KROK". https://drive.google.com/file/d/1F5-7TBiJ_5ad-2XqPKM6w1URYaXfirtb/view?usp=sharing

Pintrich, P. R., & Groot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology, 82*(1), 33–40. https://doi.org/10.1037/0022-0663.82.1.33

Price, P., Jhangiani, R., & Chiang, I. (2015). *Research Methods in Psychology* (2nd Canadian ed.). BCcampus. https://opentextbc.ca/researchmethods/

Price, J. H., & Murnan, J. (2004). Research limitations and the necessity of reporting them. *American Journal of Health Education, 35* (2), 66-67. https://doi.org/10.1080/19325037.2004.10603611

Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology, 63*(1), 539-569. https://doi.org/10.1146/annurev-psych-120710-100452

Psychology Today. (2020a). *Mental Speed Test (MST) (Version 1)*. https://www.psychologytoday.com/us/tests/iq/mental-speed-test-version-1

Psychology Today (2020b). *Time Management Skills Test (TMST).* https://www.psychologytoday.com/intl/tests/career/time-management-skills-test

Rodrigues, I. B., Adachi, J. D., Beattie, K. A., & MacDermid, J. C. (2017). Development and validation of a new tool to measure the facilitators, barriers, and preferences to exercise in people with osteoporosis. *BMC Musculoskeletal Disorders 18*(1), 1–9. https://doi.org/10.1186/s12891-017-1914-5

Santipolo, M. (2017). Bespoke Language Teaching (BLT): A proposal for a theoretical framework. The case of EFL/ELF for Italians. *Studies in Second Language Learning and Teaching, 7*(2), 233-249. https://doi.org/10.14746/ssllt.2017.7.2.4

Sari, A. M., & Nurcahyo, H. (2018). Improving students learning motivation through mobile learning. *Indonesian Journal of Biology Education/ Jurnal Pendidikan Biologi Indonesia, 4*(3), 271-276. https://doi.org/10.22219/jpbi.v4i3.6859

Schoonenboom, J., & Johnson, R. B. (2017). Wie man ein Mixed Methods-Forschungs-Design konstruiert [How to construct a mixed methods research design]. *Cologne Journal of Sociology and Social Psychology/ Kölner Zeitschrift für Soziologie und Sozialpsychologie, 69*(2), 107-131. https://doi.org/10.1007/s11577-017-0454-1

Shykhnenko, K., & Nozhovnik, O. (2020). ESP course delivered to personnel working in shifts for the state emergency service of Ukraine through a student-tailored model. *International Journal of Learning, Teaching and Educational Research, 19*(3), 295–309. https://doi.org/10.26803/ijlter.19.3.16

Sinclair, S., & Rockwell, G. (2003). *Voyant Tools.* VOYANT. https://voyant-tools.org/

Son, J.-B. (2018). *Technology in English as a foreign language (EFL) teaching.* Wiley Online Library. https://doi.org/10.1002/9781118784235.eelt0448

Talmo, T., Einum, E., & Støckert, R. (2014). Bring your own device to language class – applying handheld devices in classroom learning. In S. Jager, L. Bradley, E. J. Meima, & S. Thouësny (Eds), *CALL Design: Principles and Practice, Proceedings of the 2014 EUROCALL Conference, Groningen* (pp. 352-357). Research-publishing.net. https://doi.org/10.14705/rpnet.2014.000244

Wasfy, H. M., Wasfy, T. M., Mahfouz, R. M., & Peters, J. (2013). The education sector revolution: The automation of education*. In *Proceedings of the 120th ASEE Annual Conference & Exposition* (pp. 1-19). American Society for Engineering Education. https://doi.org/10.18260/1-2--22573

Xavier, M., & Meneses, J. (2020). *Dropout in online higher education: A scoping review from 2014 to 2018.* eLearn Center for Open University of Catalonia/eLearn Center for Universitat Oberta de Catalunya. https://doi.org/10.7238/uoc.dropout.factors.2020

Zhidkoff, R. (2020). *Using chatbots in e-learning.* Chatbots Life. https://chatbotslife.com/using-chatbots-in-e-learning-dacde1d245e5

Appendix

The satisfaction survey questionnaire based on two 7-point Likert scales (accessible via the link: https://forms.gle/YA57vSCGW7BbkuHWA)

Usefulness scale							Question	Satisfaction scale						
1	2	3	4	5	6	7		1	2	3	4	5	6	7
							1. How do you rate the usefulness and your satisfaction with the automated delivery of the English language e-classes?							
							2. How do you rate the structure design of the classes?							
							3. How do you rate the content of the classes?							
							4. How do you rate the approach to manage the participants?							
							5. How do you rate the chatbot-based approach to assess the assignments?							
							6. How do you rate the intellectual change brought by the delivery mode?							

Note: Usefulness scale: 1= Absolutely Useless; 2 = Very Useless; 3 = Moderately Useless; 4 = Neutral; 5 = Slightly Useful; 6 = Moderately Useful; 7 = Absolutely Useful.

Satisfaction scale: 1= Extremely Dissatisfied; 2 = Moderately Dissatisfied; 3 = Slightly Dissatisfied; 4 = Neutral; 5 = Slightly Satisfied; 6 = Moderately Satisfied; 7 = Extremely Satisfied.