Digital Textbook and Flipped Classroom: Experimentation of the Self-Learning Method Based on the Development of Soft Skills and Disciplinary Knowledge

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Abstract—Following adoption of the Moroccan educational system with a blended learning approach vis-à-vis the circumstances of the Covid-19 pandemic, which requires an adaptation on the part of the pedagogical actors to ensure pedagogical continuity and support students to guarantee their academic success. Our aim is to bring students to develop their own self-learning strategies to cope with the demands of the current situation through the use of a digital textbook in a flipped classroom. The sample consists of 362 students of which 54.14% are middle school students and 26.24% are male for the middle school and 23.2% in the high school. The digital textbook and the flipped classroom can improve the acquisition of disciplinary knowledge and obtain better results in students, and they can develop their soft skills. While there is a significant relationship between the development of soft skills in students and their academic success. The student 'self-learning method using the digital textbook and the flipped classroom can help develop certain soft skills in the student. To conclude, our method remains effective and relevant, and does not replace face-to-face teaching, but is a complement for the teacher to improve his or her professional practices.

Keywords—digital textbook, flipped classroom, self-learning, soft skills, disciplinary knowledge

1 Introduction

In the context of the pandemic situation, the majority of states have decided to suspend classes for the first few months by implementing an approach that transposed the principles of face-to-face learning into distance learning [1]. According to UNESCO [2], the first few months saw alarming numbers of learners affected by Covid-19-related school closures that exceeded 80%, but over time these numbers decreased to 14.8% in October 2020.

At the Moroccan scale, nearly 9.2 million students were deprived of face-to-face classes [3], as the Ministry of National Education suspended face-to-face teaching and switched to distance learning to ensure pedagogical continuity. In the 2020/2021 school season, students returned to school, adopting teaching by small groups of students in

different provinces of the Kingdom of Morocco in compliance with health measures to curb the spread of the Covid-19 pandemic.

The alternation between face-to-face learning and student self-learning (hybrid learning) that the Ministry of National Education has resorted to because schools cannot accommodate all students at the same time [4]. This scenario seems correct because of the physical distance in the institutions' halls, but it challenges the monitoring of students at a distance and the fulfillment of the curriculum.

The self-learning method is a model of learning that gives the learner freedom to choose what to learn, how to learn it, and when and where to learn it [5]. And that it is necessary to develop an awareness of one's self-learning skills and then develop effective strategies to access those skills [6]. Self-learning is just like other "autonomous" learning methods developed by the student that some works of metacognitive [7], neuro-educational [8] or similarly related to the biorhythm [9] have addressed it by reporting their direct impacts on academic performance.

In order to better manage and improve the self-learning of students, the flipped classroom is necessary since it brings benefits to the educational process [10]. This approach that contradicts with the linearity of learning and focuses on the student and make the teacher as a companion and facilitator of learning [11]. From a motivational point of view, the flipped classroom is an approach preferred by students [12-16].

In fact, there is a need to highlight the didactic materials, so that they follow this renovation insofar as they greatly facilitate the organization of the teaching/learning process. The textbook is one of the ubiquitous and indispensable didactic tools in both face-to-face and distance learning [17], which means that it is inadmissible to hope to develop teaching without introducing the digital aspect to reinforce the teaching-learning act in order to pursue its mission of knowledge production and dissemination.

In this sense, this research project constitutes a contribution allowing the teacher to adapt his reflection for operationalization of his professional practices. Our research aim is to bring students to develop their own self-learning strategies to face the demands of the current situation through the use of a digital textbook in a flipped classroom.

2   Methods and materials

2.1   Characteristics of the sample

The experimentation was carried out in two secondary schools, one middle school and one high school in the Casablanca region of the Kingdom of Morocco.

Table 1 presents the choice of the sample for this research, we opted for simple random sampling, taking into account that the population studied is made up of students sharing more or less similar characteristics. A sample of 362 students is subdivided into two cycles of secondary school:

- middle school cycle: 3 school levels with an enrollment of 196 students (54.14%, of which 27.90% are female and 26.24% are male)
- high school cycle: 2 school levels with an enrollment of 166 students (45.86%, of which 22.65% are female and 23.20% are male)

Table 1. Workforce and proportion of students by gender, school cycle, and school level

school cycle	school level	Group	gender					
			Female		male		total	
			N	*proportion*	*N*	*proportion*	*N*	*proportion*
middle school	1st year	experimental	26	7.18%	23	6.35%	49	13.54%
		Control	9	2.49%	7	1.93%	16	4.42%
	2sd year	experimental	22	6.08%	25	6.91%	47	12.98%
		Control	9	2.49%	8	2.21%	17	4.70%
	3rd year	experimental	25	6.91%	25	6.91%	50	13.81%
		Control	10	2.76%	7	1.93%	17	4.70%
	Total		101	27.90%	95	26.24%	196	54.14%
high school	1st year	experimental	32	8.84%	35	9.67%	67	18.51%
		Control	7	1.93%	9	2.49%	16	4.42%
	2sd year	experimental	35	9.67%	34	9.39%	69	19.06%
		Control	8	2.21%	6	1.66%	14	3.87%
	Total		82	22.65%	84	23.20%	166	45.86%
total of the experimental group			140	38.67%	142	39.23%	282	77.90%
total of the control group			43	11.88%	37	10.22%	80	22.10%
Total			183	50.55%	179	49.45%	362	100%

This population is further divided into two types of groups for each school level: an experimental group with 282 students (77.90%) and a control group with 80 students (22.10%) (Table 1).

Table 2 shows that the average age of the study population is 15.51 years. The average age of the middle school students is 14.47 years, for females 14.46 years and for males 14.50 years. The average age of the high school is 17.05 years, for females 17.07 years and for males 17.02 years.

Table 2. Average age of students by gender, school cycle, and school level

school cycle	school level	group	average age		
			female	*male*	*total*
middle school	1st year	experimental	14.00	13.48	13.76
		control	13.78	14.29	14.00
	2sd year	experimental	14.55	14.52	14.53
		control	14.00	14.50	14.24
	3rd year	experimental	15.44	14.96	15.20
		control	15.00	15.29	15.12
	Total		14.46	14.50	14.47
high school	1st year	experimental	16.94	16.40	16.66
		control	16.00	16.67	16.38
	2sd year	experimental	17.86	17.50	17.68
		control	17.50	17.50	17.50
	Total		17.07	17.02	17.05
Total			15.51	15.51	15.51

2.2 The research process and data analysis

In order to collect data relevant to this research, we used data measurement instruments that assess the following parameters:

- Disciplinary knowledge: situate the degree of mastery of knowledge and acquisitions in relation to the final objectives through various summative evaluations.
- Soft skills: through a scale measuring students' behaviors during learning from an affective, cognitive, and metacognitive perspective in different contexts. This scale consists of five soft skills drawn from the model of the typology of skills to be developed in students within a curriculum [18].

Table 3 shows the results of Cronbach's Alpha reliability test on the scale measuring soft skills in computer science subject. The results show that the 36 items are highly correlated given that the Cronbach's Alpha correlation value .730 is higher than the value of .700 which is often considered highly correlated [19-20].

Table 3. Cronbach's Alpha reliability tests of the scale measuring soft skills

Cronbach's Alpha	Cronbach's Alpha based on standardized items	Number of items
.730	.722	36

Data analysis was performed using the SPSS® tool (version 25, Chicago, IC, USA). To answer the research question, the results were examined using descriptive statistical analysis. The p-value is fixed ($p = 0.05$).

2.3 Procedure of the experiment

During the 2020/2021 school season, the Ministry of National Education of the Kingdom of Morocco has announced the resumption of classes at schools through the hybrid learning mode, because schools cannot accommodate all students at the same time, as well as opted for three different teaching scenarios according to each epidemiological situation of each province of the kingdom. This implemented protocol is chosen by the majority of families and according to the local epidemiological situation.

In our study context, the mode of instruction focused on alternating between face-to-face learning and student self-learning. In this teaching scenario, students in a class are divided into two groups, one group is present in class and the other group stays at home in self-learning mode, so that each class group does not exceed 50% of their capacity. Each class group will benefit from face-to-face classes at the school with a reduced hourly volume of 50% and the remaining hourly volume will be concretized to a self-learning mode of student at home under the guidance of the teacher.

In order to ensure pedagogical continuity and to succeed in the teaching-learning act, we have made available to the students a digital textbook which is a sort of physical paper edition accompanied by digital pedagogical resources. The manual is therefore a powerful lever for the student to better use his own learning strategies to solve the problems encountered, with features suitable for autonomous and self-regulated learning.

For this, the flipped classroom will be our method in which the sequence of a learning sequence goes first through a preliminary phase of self-learning of the student who will discover the learning objects via the digital textbook through different educational and digital resources (documents, online video, websites, applications ...), then the student must schematize what he/she was able to learn and complete this new knowledge, and then formulate a list of questions that will be asked in class.

During the face-to-face phase, the teacher wears the hat of a coach and learning facilitator and develops and refines new learning. Then, follow up with other appropriate learning activities. The experiment takes place in two groups:

- Experimental group: will benefit from the use of the digital textbook, as part of the flipped classroom approach.
- Control group: will only use the textbook and follow the course in a normal way.

During the period of experimentation which lasted one school year (9 months), we were able to assess the degree of mastery of the learning objects taught during this period through different summative evaluations (it should be noted that the maximum score obtained in the evaluations is 20 points, a score higher than 10/20 is good enough, a score higher than 15/20 is very good) to verify the acquisition of the learning objects.

At the end of the experimental period, a scale is distributed to the students for completion. The purpose of the scale is to estimate the soft skills that students in the experimental group were able to develop compared to students in the control group. The scale contains 36 items, including 7 items reversed to meaning. Each item is categorized to a skill: organizational skills (13 items), reflective skills (6 items), relational skills (5 items), communicative skills (4 items) and personal and human skills (8 items).

Each item measures a learner's ability to: self-critique, autonomy, self-efficacy, curiosity, resource management, defiance, motivation, enjoyment of work, time management ... Also, each item describes in relation to its context: learning outside the classroom (18 items), learning in the classroom (8 items) and learning in the classroom and outside the classroom (10 items).

The student fills in the scale statements with a numerical response between 0 and 3 (the Likert scale) of an even-numbered form to force the respondent to position him/herself. This scale offers the following values (3. very satisfied, 2. somewhat satisfied, 1. not very satisfied, 0. not at all satisfied).

3 Results

3.1 Soft skills development and disciplinary knowledge acquisition

We obtained the results below (Table 4), which are based on the scale measuring the soft skills answered by the students. We see that the overall average score obtained by the experimental group (2.16) is quite higher than the control group (1.68). Obviously, the experimental group had a fairly higher mean score in all three skills (organizational skills, reflective skills, and personal and human skills) compared to the control group.

Nevertheless, we notice that the average score of relational skills and communicative skills is almost similar between the two groups; relational skills: experimental group (2.30) and control group (2.05) - communication skills: experimental group (2.18) and control group (2.11).

It is noted that the overall average score obtained by students in the high school cycle (2.00) is quite higher than that of students in the middle high cycle (1.87). Even if we compare them according to each skill, we can see that the students of the high school cycle have a higher average score than the students of the middle school cycle.

Table 4. The average score of the scale measuring soft skills

school cycle	school level	group	average score					overall average score
			organiza-tional skills	*reflexive skills*	*relational skills*	*communi-cative skills*	*personal and human skills*	
middle school	1st year	experimental	2.11	1.99	2.24	2.05	2.07	2.09
		control	1.54	1.49	1.90	1.97	1.45	1.61
	2sd year	experimental	2.07	1.99	2.20	2.08	2.04	2.07
		control	1.35	1.66	2.06	2.16	1.57	1.64
	3rd year	experimental	2.07	2.13	2.29	2.17	2.03	2.11
		control	1.54	1.53	2.01	2.10	1.60	1.68
	Total		1.78	1.80	2.12	2.09	1.79	1.87
high school	1st year	experimental	2.14	2.17	2.30	2.21	2.12	2.17
		control	1.55	1.65	2.13	2.20	1.71	1.75
	2sd year	experimental	2.33	2.30	2.46	2.39	2.35	2.35
		control	1.51	1.52	2.14	2.09	1.70	1.70
	Total		1.88	1.91	2.31	2.23	1.97	2.00
total (experimental group)			2.14	2.11	2.30	2.18	2.12	2.16
total (control group)			1.50	1.57	2.05	2.11	1.60	1.68
Total			1.82	1.84	2.17	2.14	1.86	1.92

Table 5 shows the results of the Shapiro-Wilk normality test of the mean scores of the scale measuring soft skills obtained by the two groups, both groups have a significance value above the p-value level of 0.05; experimental group (0.194) and control group (0.663).

Table 5. Normality test of the scale measuring soft skills – Shapiro-Wilk

		statistics	ddl	p-value
overall average score	experimental group	.993	282	.194
	control group	.988	80	.663

The results in Table 6 show that the students in the experimental group obtained average score of (2.16) which is quite higher than the control group with average score of (1.68). The difference between the two groups (experimental group and control group) is therefore significant; t-test = 21.576, ddl = 360, p = .000.

Table 6. Student's t test for independent samples (experimental group and control group) on the overall average score of the scale measuring soft skills

		t-test for equality of means						
		t	ddl	p-value (two-sided)	Average difference	Standard error difference	Confidence interval of the difference at 95%.	
							Lower	*Superior*
overall average score	Hypothesis of equal variances	21.576	360	.000	.49826	.02309	.45285	.54367
	Unequal variances assumption	22.042	131.327	.000	.49826	.02260	.45354	.54298

In addition, and according to the collection of students' academic results regarding disciplinary knowledge. The results in Table 7, show that the average grade obtained by the experimental group (15.96) is quite higher than the control group (13.16). These results show that for each type of exercise, the experimental group always had higher grades than the control group.

Table 7. The average score of the scale measuring soft skills

school cycle	school level	group	average grade				overall average grade
			direct questions	*problem solving exercises*	*group project*	*student's project*	
middle school	1st year	experimental	15.56	15.48	15.36	15.64	15.50
		control	12.12	12.76	12.64	12.36	12.47
	2sd year	experimental	14.80	14.28	14.80	14.88	14.70
		control	13.04	11.64	13.28	12.60	12.65
	3rd year	experimental	15.88	15.24	15.36	15.44	15.48
		control	14.00	12.84	13.28	12.00	13.03
	total		14.24	13.72	14.12	13.84	13.97
high school	1st year	experimental	16.04	15.80	16.00	16.20	16.01
		control	13.76	14.00	14.64	14.52	14.22
	2sd year	experimental	18.04	18.16	17.84	18.36	18.11
		control	12.84	14.28	13.28	13.28	13.43
	total		15.20	15.56	15.44	15.60	15.44
total (experimental group)			16.08	15.80	15.88	16.12	15.96
total (control group)			13.16	13.12	13.44	12.96	13.16
Total			14.60	14.44	14.64	14.52	14.56

Table 8 shows the results of the Shapiro-Wilk normality test on the academic results obtained by the two groups, both groups have a significance value that is below the .05 p-value level of significance; experimental group (.000) and control group (.015).

Table 8. Normality test of the average grades in disciplinary knowledge- Shapiro Wilk

		statistics	ddl	p-value
average grade	experimental group	.901	282	.000
	control group	.961	80	.015

The results of the table (Table 9) show that the students in the experimental group obtained a good average score of (15.96) quite higher than the control group with an average score of (13.16). The difference between the two groups (experimental and control groups) is therefore significant according to the independent sample Mann-Whitney U test with a significance value of .000 well below the .05 of p-value.

Table 9. Mann-Whitney U test of independent samples (experimental group and control group) of the average of the students' grades in disciplinary knowledge

Null hypothesis	Test	Sig.	Decision
The distribution of disciplinary knowledge is identical on the group categories	Mann-Whitney U test of independent samples	.000	Reject the null hypothesis

The asymptotic significance is displayed. The significance level is .05.

Table 10 shows the results of the normality tests Shapiro-Wilk of the average score of the scale measuring soft skills and the students' grades in disciplinary knowledge. The both variables have a significance value of .000 which is well below the significance level of p-value .05.

Table 10. Normality tests of the average score of the scale measuring soft skills and the students' grades in disciplinary knowledge – Shapiro-Wilk

	statistics	ddl	p-value
Average score (soft skills)	.970	362	.000
Average grade (disciplinary knowledge)	.910	362	.000

The table shows the correlation between the average score of the scale measuring soft skills and the students' grades in disciplinary knowledge during the experimental period. Indeed, Sperman's Rho correlation test shows a positive and highly significant relationship ($r = .822$, $p = .000 < .01$) (Table 11).

Table 11. Sperman's Rho correlation coefficient test between the average score of the scale measuring soft skills and the students' grades in disciplinary knowledge

		Average score (soft skills)	Average grade (disciplinary knowledge)
Average score (soft skills)	Correlation coefficient	1	.822[**]
	Sig. (bilateral)		.000
	N	362	362
Average grade (disciplinary knowledge)	Correlation coefficient	.822[**]	1
	Sig. (bilateral)	.000	
	N	362	362

[**] The correlation is significant at the 0.01 level (two-tailed).

3.2 The correlation between soft skills and the learning context

Organizational skills. The results of the regression analysis (Table 12) show that there is a highly strong correlation between learning outside of class and organizational skills developed in the student (r=.912; p=.000<.01). We have a strong correlation between learning outside of class and in class and organizational skills (r=.560; p=.000<.01). Nevertheless, learning in class shows a weak correlation with organizational skills (r=.291; p=.000<.01).

Table 12. Regression analysis between organizational skills and learning context

		organizational skills	context		
			learning outside of class	*learning in class*	*learning outside of class and in class*
Pearson correlation	organizational skills	1.000	.912	.291	.560
	learning outside of class	.912	1.000	.320	.542
	learning in class	.291	.320	1.000	.298
	learning outside of class and in class	.560	.542	.298	1.000

These last results are affirmed by the summary table of the models (Table 13), which shows that the coefficient of R-two is strongly high (R-two = .838) which then explains the variability of the model, as well as the variation of F shows a very strong significance (F=619.072; p(F)=.000<.01).

Table 13. Summary of models[b] from the regression analysis test: organizational skills

Model	R	R-two	R-two adjusted	Standard error of the estimate	Edit statistics					Durbin-Watson
					Variation of R-two	*Variation of F*	*ddl1*	*ddl2*	*Sig. Variation of F*	
1	.916[a]	.838	.837	.15490	.838	619.072	3	358	.000	2.114

a. Predictors: (Constant), learning outside of class, learning in class, learning outside of class and in class
b. Dependent variable: organizational skills

Reflexive skills. Table 14 shows that there is a strong correlation between the three modes of learning context and reflexive skills developed in the student; learning outside of class and in class (r=.636; p=.000<.01), learning outside of class (r=.530; p=.000 <.01), and less than the last two learning in class (r=.440; p=.000<.01).

Table 14. Regression analysis between organizational skills and learning context

		reflexive skills	context		
			learning outside of class	*learning in class*	*learning outside of class and in class*
Pearson correlation	reflexive skills	1.000	.530	.440	.636
	learning outside of class	.530	1.000	.320	.542
	learning in class	.440	.320	1.000	.298
	learning outside of class and in class	.636	.542	.298	1.000

These last results are affirmed by the summary table of the models (Table 15), which shows that the coefficient of R-two is quite strong (R-two = .503) which then explains the variability of the model, as well as the variation of F shows a very strong significance (F=120.703; p(F)=.000<.01).

Table 15. Summary of models[b] from the regression analysis test: reflexive skills

Model	R	R-two	R-two adjusted	Standard error of the estimate	Edit statistics					Durbin-Watson
					Variation of R-two	*Variation of F*	*ddl1*	*ddl2*	*Sig. Variation of F*	
1	.709[a]	.503	.499	.30799	.503	120.703	3	358	.000	1.904

a. Predictors: (Constant), learning outside of class, learning in class, learning outside of class and in class
b. Dependent variable: reflexive skills

Relational skills. Table 16 shows that there is a weak correlation between the three modes of learning context and relational skills developed in the student; learning outside of class (r=.394; p=.000<.01), learning outside of class and in class (r=.329; p=.000<.01), and less than the last two learning in class (r=.216; p=.000<.01).

Table 16. Regression analysis between relational skills and learning context

		relational skills	context		
			learning outside of class	*learning in class*	*learning outside of class and in class*
Pearson correlation	relational skills	1.000	.394	.216	.329
	learning outside of class	.394	1.000	.320	.542
	learning in class	.216	.320	1.000	.298
	learning outside of class and in class	.329	.542	.298	1.000

These latter results are affirmed by the model summary table (Table 17), which shows that the coefficient of R-two is quite small (R-two = .108), as well as the variation in F shows quite strong significance (F=26.117; p(F)=.000<.01).

Table 17. Summary of models[b] from the regression analysis test: relational skills

Model	R	R-two	R-two adjusted	Standard error of the estimate	Edit statistics					Durbin-Watson
					Variation of R-two	*Variation of F*	*ddl1*	*ddl2*	*Sig. Variation of F*	
1	.424[a]	.180	.173	.34035	.180	26.117	3	358	.000	1.998

a. Predictors: (Constant), learning outside of class, learning in class, learning outside of class and in class
b. Dependent variable: relational skills

Communicative skills. The results of the regression analysis (Table 18) show that there is a highly strong correlation between learning in class and communicative skills developed in the student (r=.743; p=.000<.01). Nevertheless, communicative skills show a weak correlation with learning outside of class (r=.205; p=.000<.01) and with learning outside of class and in class (r=.179; p=.000<.01).

Table 18. Regression analysis between communicative skills and learning context

		communicative skills	context		
			learning out-side of class	*learning in class*	*learning outside of class and in class*
Pearson correlation	communicative skills	1.000	.205	.743	.179
	learning outside of class	.205	1.000	.320	.542
	learning in class	.743	.320	1.000	.298
	learning outside of class and in class	.179	.542	.298	1.000

These last results are affirmed by the summary table of the models (Table 19), which shows that the coefficient of R-two is quite strong (R-two = .555) which then explains the variability of the model, as well as the variation of F shows a very strong significance (F=148.725; p(F)=.000<.01).

Table 19. Summary of models[b] from the regression analysis test: communicative skills

Model	R	R-two	R-two adjusted	Standard error of the estimate	Edit statistics					Durbin-Watson
					Variation of R-two	*Variation of F*	*ddl1*	*ddl2*	*Sig. Variation of F*	
1	.745[a]	.555	.551	.26602	.555	148.725	3	358	.000	2.080

a. Predictors: (Constant), learning outside of class, learning in class, learning outside of class and in class
b. Dependent variable: communicative skills

Personal and human skills. The results of the regression analysis (Table 20) show that there is a strong correlation between learning outside of class and in class and personal and human skills developed in the student (r=.697; p=.000<.01) and with learning outside of class (r=.622; p=.000<.01). Nonetheless, learning in class showed a weak correlation with personal and human skills (r=.365; p=.000<.01).

Table 20. Regression analysis between personal and human skills and learning context

		personal and human skills	context		
			learning out-side of class	*learning in class*	*learning outside of class and in class*
Pearson correlation	personal and human skills	1.000	.622	.365	.697
	learning outside of class	.622	1.000	.320	.542
	learning in class	.365	.320	1.000	.298
	learning outside of class and in class	.697	.542	.298	1.000

These latter results are affirmed by the model summary table (Table 21), which shows that the coefficient of R-two is quite strong (R-two = .583) cd which therefore explains the variability of the model, as well as the variation in F shows very strong significance (F=166.535; p(F)=.000<.01).

Table 21. Summary of models[b] from the regression analysis test: personal and human skills

Model	R	R-two	R-two adjusted	Standard error of the estimate	Edit statistics					Durbin-Watson
					Variation of R-two	*Variation of F*	*ddl1*	*ddl2*	*Sig. Variation of F*	
1	.763[a]	.583	.579	.26779	.583	166.535	3	358	.000	2.207

a. Predictors: (Constant), learning outside of class, learning in class, learning outside of class and in class
b. Dependent variable: personal and human skills

Soft skills. The results of the regression analysis (Table 22) show that there is a highly strong correlation between learning outside of class and soft skills developed in the student (r=.912; p=.000<.01) and with learning outside of class and in class (r=.771; p =.000<.01). Nevertheless, learning in class showed a medium correlation with soft skills (r = .543; p = .000 < .01).

Table 22. Regression analysis between soft skills and learning context

		soft skills	context		
			learning outside of class	**learning in class**	**learning outside of class and in class**
Pearson correlation	soft skills	1.000	.912	.543	.771
	learning outside of class	.912	1.000	.320	.542
	learning in class	.543	.320	1.000	.298
	learning outside of class and in class	.771	.542	.298	1.000

These last results are affirmed by the summary table of the models (Table 23), which shows that the coefficient of R-two is strongly high (R-two = .987) which therefore explains the variability of the model, as well as the variation of F shows a very strong significance (F=8839.178; p(F)=.000<.01).

Table 23. Summary of models[b] from the regression analysis test: soft skills

Model	R	R-two	R-two adjusted	Standard error of the estimate	Edit statistics					Durbin-Watson
					Variation of R-two	*Variation of F*	*ddl1*	*ddl2*	*Sig. Variation of F*	
1	.993[a]	.987	.987	.03195	.987	8839.178	3	358	.000	2.155

a. Predictors: (Constant), learning outside of class, learning in class, learning outside of class and in class
b. Dependent variable: soft skills

4 Discussion

First, let us recall that the aim of our research is to bring students to develop their own self-learning strategies to face the demands of the current situation through the use of a digital textbook in a flipped classroom.

The digital textbook and the flipped classroom can improve the acquisition of disciplinary knowledge and obtain better results, which is approved by the results obtained showing that the average score obtained by the experimental group (15.96) is quite

higher than the control group (13.16). These results show the same difference according to the different summative evaluations and even according to the school cycle and school level.

These results have been confirmed by some works that consider that the flipped classroom leads to improve students' academic results [21-30]. Also, research has shown that academic outcomes have been improved with flipped classrooms compared to traditional courses [14; 31-33]. Similarly, [34; 35] who determined that the flipped classroom promotes learning efficiency and teaching quality.

In the same way, for [36; 37] showing that the use of digital textbook can lead to better academic outcomes. Likewise, for [38] who showed that students learn much better in flipped classrooms when technology is leveraged compared to traditional courses. Also, for [21] explaining that learning through flipped classroom has played an important role so that traditional teaching methods are replaced by new methods based on technology tools.

The digital textbook and the flipped classroom can develop soft skills in students, which is approved by the results obtained showing that the average score of soft skills of the experimental group (2.16) is quite higher than the control group (1.68), especially for organizational skills, reflexive skills and personal and human skills that show a significant difference between the two groups. Nevertheless, relational skills and communicative skills do not show any difference since the results are quite similar.

These results have been confirmed by some works that consider that the flipped classroom can promote to develop certain abilities or soft skills in the student [23-27; 39-44]. Also, [21] report that the flipped classroom showed a positive influence on cognitive, affective, and non-technical skills.

Likewise for other works that consider that the flipped classroom has positive effects on improving student engagement and making the student more active [26;31;45]. Also, [46] express that student has great autonomy in learning to use the flipped classroom.

Similarly, for other works that consider technological tools as an important factor in developing soft skills through flipped classroom [21;41;43;45;47-49]. Also, [47] exploring the effectiveness of the digital textbook in increasing learners' proficiency. Likewise for other work showing that the use of digital tools or a digital textbook elicits student engagement in the completion of learning activities [36;48].

Nevertheless, [50] show that the flipped classroom did not have a substantial impact on student performance, attendance, or soft skills, and according to [51] show that the flipped classroom has a small impact on student academic success.

From another point of view, the results show that students who have developed soft skills can perform well academically, this result is endorsed by the high significance of the correlation between them (correlation coefficient = .822, p = .000 < .01).

These results have been confirmed by some works that consider that there is a significant relationship between soft skills and academic performance in students [28;52-55]. As well as [52;53] express that the development of soft skills should be a major factor in academic programs to improve students' academic performance.

The student's self-learning (learning outside the classroom) through the use of digital textbook and flipped classroom can contribute to developing some soft skills in the student, which is approved by the results obtained showing that the soft skills developed

by students outside the classroom (, 912) are quite higher than in class (,543), especially for organizational skills (,912) which are strongly developed, personal and human skills (,622) and reflexive skills (,530) are quite strongly developed and relational skills (,394) and communicative skills (,205) are quite weakly developed.

These results are similar with the second result which shows that the mean score results of the two groups on relational skills and communicative skills showed no difference knowing that the results are quite approximate.

These findings have been confirmed by some works that consider that the student's flipped and active self-learning is related to the development of some soft skills [56-58]. And according to [59] showing that the use of flipped classroom can help develop self-learning ability in students. As well as a study found that students had higher post-test scores than pre-test scores during self-study via an online video using the flipped classroom [60]. Similarly, [43] consider that in-class and out-of-class activities may have encouraged student learning and fostered their attitudes.

However, we found that some students developed abilities that allowed them to go beyond the concept of self-learning, and that they were able to achieve self-regulation, that the latter is related to the development of soft skills and to achieving better results [61-66]. Similarly, other findings show the importance of self-regulation for successful flipped classroom focused instruction aided by digital tools [25;63;67-68].

Limitations of our research seem to be mentioned:

- The experiment focused on a single context and a single discipline.
- The flipped classroom involves an increase in student and teacher workload [69], which could complicate its implementation.
- The experiment did not control for a variable of teacher influence on the appropriate use of the digital textbook and flipped classroom applications.
- The unavailability or lack of ICT resources (computer, tablet...) to use the advantages of the digital textbook or to apply some flipped classroom methods can influence some results knowing that 51% of students encounter this problem following the courses according to their teachers [4].

5 Conclusion

With the advent of new didactic tools and active pedagogy, the student becomes more and more accustomed and develops his own learning strategies to develop capacities and create his own self-regulation model.

The digital textbook remains a fundamental tool, facilitating the teacher's intervention and constituting a frame of reference for the student to build his or her learning on a strong foundation. And the flipped classroom is an approach in which learning is spread out over the student's autonomy to encourage the anchoring and deepening of knowledge in a phase prior to a face-to-face phase.

The digital textbook and flipped classroom can improve the acquisition of disciplinary knowledge and get better results in students, and they can develop their soft skills.

While there is a significant relationship between the development of soft skills in students and their academic success. The student's self-learning method using the digital textbook and the flipped classroom can help develop certain soft skills in the student.

No one can deny that it is important for students to develop soft skills during their high school years to be able to easily enter higher education. Soft skills are an undeniable lever that will allow students to better apprehend school, university, and professional life.

To follow up the results, we consider that the present study is a preliminary phase of a second study that aims to analyze the development of soft skills in students during the university cycle through the educational system "Bachelor" which promotes the development of soft skills through a curriculum consisting of a set of skills namely: study skills, life skills, civic skills, and professional skills.

6 References

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