Innovation in the University: Perception, Monitoring and Satisfaction

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***Abstract*— A blended learning teaching experience conducted at Spain's National Distance University is described. The project consisted of integrating technology (a virtual learning platform) and teaching methodologies (multimedia contents, weekly deliverables, continuous self-assessment, mentoring, a four-month timetable and webinars) to enhance student engagement, performance and satisfaction.**

A statistical study showed that self-assessment and professor monitoring are key issues in students' initial perception and ultimate satisfaction as well as the most effective tools for preventing dropout.

Project participants had a lower dropout rate and higher grades than non-participants.

***Keywords*: Blended learning, innovation, satisfaction, ICT**

I. INTRODUCTION AND STATE-OF-PLAY

Many technologies have been introduced or come into general use in education in recent years. The NMC (New Media Consortium) Horizon Report 2012 cited the following trends in university education: mobile apps, tablets, game-based learning, learning analytics, gesture-based computing and the internet of things [1], many already consolidated today. The 2016 edition of the same report [2] listed systems such as bring your own device (BYOD), learning analytics and adaptive learning, augmented and virtual reality and makerspaces and, in the medium term, affective IT and robotics applied to higher education. The sheer length of those two lists attests to the accelerated use of technology in education.

ICTs constitute an essential innovation tool [3]-[7], particularly in education [8]-[12], an issue amply discussed in the literature. The latest UNIVERSITIC [13] report revealed that Spanish universities and their faculties are highly favorable to becoming involved and collaborating in the routine integration of ICTs. The application of new technologies does not suffice to generate good educational practice, however. They must also be integrated with methodologies geared to the academic institution's objectives and adapted to its operating procedures, so the general approach redounds to effective improvement in teaching quality. Such integration is the key to achieving learning objectives, in keeping with students' and the institution's specific educational context, and of interest as well as to society at large [14]. The respective measures cannot be adopted separately. Rather, progress must be made simultaneously on several fronts to ensure that technological innovations are aptly channeled to learning processes [15]. Otherwise, the active application of methodologies may fail to generate significant advantages and the implementation of inappropriately coordinated online resources may even have adverse effects [16]-[19].

Integrating technology with active (traditional and non-traditional) methodologies [20], [21] to respond to students' increasingly diverse needs and demands for quality is crucial [22]. In recent years, ICTs have been integrated in experiences in the form of virtual educational portfolios, tablets, blogs, virtual networks, educational minivideos, podcasts, digital communication or open-source educational resources, to name a few. The many aims pursued include an analysis of the effects on undergraduate training and the implementation of flipped classroom methodology, self-teaching and self-assessment, service-learning, project-based learning, learning assessment, learning community training, and the social impact of educational technology.

In that context, innovative education projects become a key to instructional evolution and the innovation of teaching mechanisms that can be standardized for general use. Knowing what is needed to generate effective innovation in higher education is vital to that endeavor. In an attempt to contribute to its understanding, the present study focuses on ICT-based methodological innovations applied to teaching.

This article discusses the objectives, methodology and results of the "Red de Enriquecimiento metodológico y aprendizaje colaborativo en Finanzas" [network for methodological enhancement and collaborative learning in finance], a project conducted in academic year 2015/2016 as an enlargement on earlier initiatives. Designed in the context of educational

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innovation, it combines technology and activity geared to lifelong learning with the participation of professors, tutors and mentors.

The project studied teaching-learning at three stages that together cover the entire process.

An analysis was first performed of a priori predisposition toward the instrumental aspects of teaching (use of traditional vs. recording-editing tools) and virtual social communication. That was followed by an attempt to encourage mastery of the instrumental techniques involved in ICTs applied to finance throughout the teaching process. The results were then assessed via continuous monitoring and gauging student perception of the mentor's role during the course.

The approach encompassed the entire teaching process, including the aprioristic study of students' inclination or preferences, the application of new techniques, monitoring throughout the learning process and assessment of participant performance. As in prior research, the study compared students' initial perspectives to their post-experience impressions. The findings were analyzed with statistical tools to obtain additional information on the factors or aspects where the two differed. The triple analysis described has been amply addressed in the literature.

Initial perception affects professors' and students' motivation and interest in innovative teaching projects. This perception conditions so the advantages of the aforementioned projects. The authors' experience also shows that it conditions students' choices as well as their performance. An adequate initial structure raises the likelihood of success in experiences conducted in university environments. Students are generally open to teaching innovation projects [23], given the substantial advantage entailed, a priori, in understanding and assimilating content, which they assume will be mirrored in their final grade [24].

Students nonetheless identify certain limitations [25] directly related to their procedural and methodological illiteracy and the lack of institutional resources and support [26]. While the initial perception suggests that educators should re-orient their role as knowledge conveyers, that idea is not always fully interiorized by professors, who limit change to adapting new channels and tools to existing teaching practice [27]. Adaptation to new active methodologies calls for considerable effort, not only on the part of universities and educators but of students as well, for the more intense their participation in the process, the greater is their motivation and engagement [28].

Monitoring the learning process, the practical application of methodologies and procedures designed for learning, is crucial to education. Consistent planning and appropriate implementation of processes and activities favor: clearer content delivery; the use of interactive resources that facilitate students' independent and continuous understanding of concepts; enhanced communication flows and channels; access to more information; and the development of specific skills such as analytical and problem-solving capacities, among others [29]. Nonetheless, as the inclusion of ICTs in education entails a transformation but not a simplification of the teaching process, professors must devote more time to teaching tasks when applying these active methodologies [30].

One of the most important aspects of the monitoring phase is the acquisition of *learning to learn* skills. Learning and assessment must not be confounded with the final grade, for "[...] In light of our modus operandi, professors might be said to be teaching machines and students learning machines; educators assessment machines and learners machines that are assessed [...]" [31]. Active methodologies should enable professors to observe and students to identify learning progress, as well as the gaps in theoretical and practical knowledge. That is requisite to compliance with the present legal framework that governs higher education, in which learning is not confined to the understanding of concepts but also to developing new capacities and skills.

Student satisfaction and their evaluation of the tools used and activities performed must also be determined. Two research routes or approaches can be identified in the analysis of the effective integration of ICTs in learning [23]. In one, the reference used is academic performance or grades [32]- [34], even though the final grade may be distorted by any number of events or factors scantly related to the subject matter studied, to mention just one drawback. The other analyses the degree of satisfaction with the process and activities [35] and with it, the development of skills and capacities which, if acquired, ultimately contribute to improving the learning process.

II. Material and methods

The European Higher Education Area (EHEA) conceives instruction as a dynamic process involving both content and educational procedures and models. It recommends adapting and applying ICTs to capitalize on their potential. This transition to "digital education" is particularly relevant in universities delivering distance and/or blended learning, such as Spain's National Distance University (UNED), the country's largest higher education institution[1], where the experience described here was conducted.

The UNED's status as a public, central State institution delivering formal education, along with its size and broad geographic reach make it a paradigm of blended learning. Such learning environments combine the traditional face-to-face model with distance education based on the intensive use of technology. They therefore draw from many diverse components of training that favor lifelong learning and its penetration in large-scale learning environments with innovative tools such as interactive programs and simulations, webinars and social networks [36].

At the same time, b-learning systems pose complex

[1] The UNED's primary objective is to provide higher education to those for whom attending traditional or face-to-face universities is especially difficult, whether for reasons of geography or the need to combine schooling with occupational or other obligations. At this time it is Spain's largest university. With over 235 000 students enrolled per year, it has 1400 professors, 6300 tutors and a large network of associated institutions across the country and beyond. It offers 27 four-year degrees, 68 official masters' degrees and 18 doctorates. Its student profile is very varied, although most are in the 25-45 age bracket. Nearly 40 % of all students with disabilities are enrolled at the UNED, and close to 1000 enrollees study from penitentiaries.

challenges in connection with learning assessment in skills-based training, in particular as regards the migration to a new educational and methodological approach to teaching-learning. Some authors [37] stress not only the need to adapt curricula to such skills-based training but also to make the changes required to diversify and broaden assessment criteria, resources and tools.

Others [36] note that institutional involvement and engagement are imperative if technology is to contribute to improving learning capacity. That is the backdrop for the teaching innovation network projects furthered by universities.

More specifically, the experience analyzed in this article was conducted in a UNED teaching innovation network, applied to the courses "Investment and Finance" (third year, Business Administration) and "Corporate Economics: Investment and Financing" (second year, Economics). Both delivered at the Economics and Business Administration Faculty, they sum around 1700 enrollees per year between them.

The participants in this experience were volunteers enrolled in one of the two courses. To encourage participation, students completing all the activities planned and explained from the outset were awarded two ECTS (standardized European Union) credits.

The network rested on three mainstays:

1) Continuous student monitoring in all the activities proposed (summaries, outlines, forms, videoconferences-recordings) and evaluation of engagement in the project.
2) Design of an end of course survey to analyze:
   a) improvements in skills and performance after incorporating EHEA methodological strategies
   b) student appraisal of the initiative and in particular their feedback on the activities that contributed most to enhancing their performance.
3) Support in the form of a mentor, in addition to assistance generally available to all enrollees. That role is played by last-year students with a good academic record who have developed appropriate study skills. Their experience also affords them a thorough understanding of the institution and the methodology, while their proximity to the students mentored places them in an ideal position to contribute to the learning endeavor [38]. In this particular case, the mentor was a course alumnus who held specific counselling sessions with project participants and could be broached by them for bi- or multi-lateral inquiries.

The project consequently revolved around a suite of activities (Table I) subject to continuous assessment for which students were receiving standing (synchronous and asynchronous) support.

TABLE I.
PROJECT ACTIVITY SEQUENCE

Activity	*Description*	*Performed*
Initial survey	*Participants answered a questionnaire addressing not only academic information (hours of study, course enrollments, courses passed...) but professional and personal circumstances as well (possible synergies with employment, factors limiting study time)*	*At project outset*
Time planning	*A timetable or Gantt chart was used to plan and assign the time available for each course lesson by lesson, bearing in mind the difficulty and demands of each chapter.*	*At the beginning of the course*
Activity 1 (A1) Summary	*Students wrote up and turned into the professor a chapter summary to help them prepare the content.*	*After each lesson*
Activity 2 (A2) Self-assessment test	*Before the end of the time assigned for each lesson, professors furnished students with a self-assessment exercise to be performed to determine their command of the content.*	*After each lesson*
Activity 3 (A3) Videoconference sessions	*One videoconference session was scheduled in which students could participate to discuss the lesson or general questions with a member of the teaching team and other students. That afforded an opportunity not only to clarify doubts but also for students to learn about and comment on lesson-related issues.*	*After each lesson*
Activity 4 (A4) Mentoring	*Course alumni who also represented students and collaborated in the project initially scheduled two sessions to counsel student-participants about the project based on their experience in the area and the UNED in general.*	*Two sessions*
Final survey	*At the end of the project, students answered a quality questionnaire on specific project features with a view to improvements and error correction.*	*Upon project finalization*

The use of ICTs was essential in all the activities described due to participants' geographic dispersion and the concomitant use of telematics to communicate with them to provide continuous assessment and collect supplementary information (pre- and post-project surveys). The technological tools used included the UNED's virtual platform (dot-RN format, self-managed aLF) and electronic mail for routine communication; online conferencing and recorded webinars for monitoring; the UNED's virtual platform for specific self-assessment exercises; and Google forms for the pre- and post-project surveys.

A total of 42 students initially applied for participation in the project. While their responses to the survey provided insight into student profiles and expectations, the results and final evaluation were based solely on the 28 participants who stayed in the project through the end. At 33 %, the project dropout rate was in line with the rate recorded for UNED students aspiring to the degrees at issue: given the typical profile (people with full-time employment, family obligations), only around 45 % of enrollees take their final exams on the first opportunity afforded. Moreover, dropping out of the project does not entail dropping out of the course or the university. Rather, it is normally the outcome of a reconsideration of timing and obligations as the course progresses. The student profile was based on the pre-project survey to which all project participants

responded[2], the results of which were consistent with the data for the university as a whole.

Project results were based on three instruments: student self-assessments performed throughout the course, their final grade (in the course) and their replies to the post-project survey. The questionnaire was divided into a number of categories: evaluation of the course (overall and of aspects deemed to be significant); general evaluation of the project; evaluation of project activities; and fulfillment of expectations around the project and related activities.

The analysis, in turn, discussed in the following section, revolved around three main areas.

1) Firstly, initial expectations[3] were compared to the post-project evaluations to ascertain whether students' profiles or their prior expectations had any effect on those evaluations or academic performance. Statistical methodology involving pairwise comparison was applied, assuming equal variances and a significance level of 0.05 adjusted as per Bonferroni's correction.
2) Project participant evaluation of the course was subsequently analyzed and contrasted statistically to the scores for all enrollees using Student's t test for independent samples. For the item "utility of self-assessments" the analysis was performed bearing in mind that the samples were related, with each observation constituting a data pair.
3) The suitability of instituting projects such as this in all the courses comprising the curriculum was analyzed on the grounds of the opinions of the students who participated in the project through the end.

III. Analysis and Results

The three main areas analyzed are discussed below.

A. Pre-project expectations and post-project evaluations

The initial expectations around project participation and their fulfillment at the end were determined from a series of items with five ordinal categories, ranging from 'very low', which scored as 0, to 'scantly relevant/low', with a value of 2.5 and so on to a score of 10 for 'determinant/very high'.

Those scores were applied to participants' responses to the survey to calculate the mean values.

The results in Table II show that the final evaluation was slightly higher than the initial expectations, primarily because the students who abandoned the project had lower expectations at the outset. Student's t test for equality of means (Table III) revealed significant differences in three items that proved to be instrumental to the initiative.

TABLE II.
INITIAL EXPECTATIONS AND FINAL EVALUATION (0-10)

	Survey	
	Pre-project	Post-project
	Expectations	Final evaluation
Preparation, time optimization and planning	8.04	8.48
Improvement in performance	7.38	7.77
Extracurricular credits	4.17	8.04
Teaching team guidance	5.95	8.57
Use of new study techniques and ICTs	5.83	7.14
Guidance furnished by mentor	5.65	6.70
Utility of summaries and outlines	7.08	7.95
Utility of webinars/chats	6.61	7.50

TABLE III.
TEST FOR EQUALITY OF MEANS BETWEEN INITIAL EXPECTATIONS AND FINAL EVALUATION

	Survey	
	Pre-project	Post-project
	(A)	(B)
Preparation, time optimization and planning		
Improvement in performance		
Extracurricular credits		A
Teaching team guidance		A
Use of new study techniques and ICTs		A
Guidance furnished by mentor		
Utility of summaries and outlines		
Utility of webinars/chats		

Where the mean score in one survey was significantly lower than in the other, the letter heading the column for the survey at issue is shown in the other column.

TABLE IV.
PROFILES OF STUDENTS VOLUNTEERING FOR THE PROJECT

		Students not completing the project		Students completing the project		Total	
		Abs. number	%	Abs. number	%	Abs. number	%
Level of education	High school	9	64.3%	6	21.4%	15	35.7%
	Ent.exam adults>25	1	7.1%	3	10.7%	4	9.5%
	Ent.exam adults>45	0	0.0%	0	0.0%	0	0.0%
	Vocational training	1	7.1%	7	25.0%	8	19.0%
	Associate degree	1	7.1%	3	10.7%	4	9.5%
	Four-year degree	1	7.1%	0	0.0%	1	2.4%
	Five-year degree	1	7.1%	8	28.6%	9	21.4%
	PhD.	0	0.0%	1	3.6%	1	2.4%
	Total	14	100.0%	28	100.0%	42	100.0%
Age bracket	30 or under	7	50.0%	7	25.0%	14	33.3%
	31 to 40	2	14.3%	12	42.9%	14	33.3%
	Over 40	5	35.7%	9	32.1%	14	33.3%
	Total	14	100.0%	28	100.0%	42	100.0%
Obligations	Paid employment	12	85.7%	21	75.0%	33	78.6%
	Family	9	64.3%	22	78.6%	31	73.8%
	Caregiving	4	28.6%	10	35.7%	14	33.3%
	Total	14	100.0%	28	100.0%	42	100.0%
Paid employment	None	2	14.3%	6	21.4%	8	19.0%
	15-30 hours/week	3	21.4%	5	17.9%	8	19.0%
	> 30 hours/week	9	64.3%	17	60.7%	26	61.9%
	Total	14	100.0%	28	100.0%	42	100.0%

1) Extracurricular credits (with an initial expectation of 4.17 and a final evaluation of 8.04)
2) Teaching team guidance (5.95 vs. 8.57)
3) Use of new study and ICT techniques (5.83 vs.7.14).

[2] The survey included questions on age, sex, initial level of education, origin, availability of electronic resources, use of IT tools and obligations that might limit study time, among others.

[3] Initial expectations as expressed in the pre-project survey, which collected both academic data, such as time devoted to study and courses passed, and students' personal and professional circumstances, including professional synergies and factors limiting study time.

Of the above three areas, two – teaching team guidance and extracurricular credits – were among the most highly evaluated, along with preparation, time optimization and planning, where initial expectations were fulfilled.

The items with the lowest evaluation (and expectations) were mentor guidance (due in part to the teaching team's efficacy, which prompted students to raise their initial expectations by 2.6 points) and the use of new study and ICT techniques. Although expectations for the latter were not initially very high, the score rose by 1.3 points in the final evaluation.

Students' initial expectations for the project, which they assumed would facilitate the learning process, were largely fulfilled: teaching team guidance in preparing course lessons was evaluated very highly, while the post-project appreciation of extracurricular credits greatly exceeded initial expectations.

An analysis of student profiles showed that of the 14 who failed to complete the project, 11 (78.6 %) had no prior university training. By age, they were in the youngest and oldest brackets. The youngest dropped out for reasons in keeping with their age and the oldest due to lower expectations around the utility of ICTs and new study techniques (Table IV).

B. Participants' perceived satisfaction. Impact on overall course evaluation

Table V shows the mean scores and standard deviations for the course items as evaluated by the 28 students who completed the project. The method used was the same as described in the preceding section, on a scale of 0 to 10.

All the course items were scored highly, in particular the utility of self-assessment (9.11), which proved to be a very useful tool for course preparation. The 0.57-point higher grade on these exercises than on the final exam, while not significant (Table VI), is attributable to students' known tendency to overestimate their grade where a pass/fail or good/outstanding is at stake.

The items with the highest scores, at over 8.5, were teaching team response to inquiries and virtual course structure and organization. The utility of quarterly exams for preparing the final also scored highly, at 8.3.

Students were somewhat more critical of the grading system, with a score of just 7.0 for the final exam as an accurate measure of the knowledge acquired.

The comparison of project participant to general course enrollee evaluation of the course in Table VII showed significantly higher scores (in red) for the former in most of the items analyzed. The inference is that participation in these activities had a clearly beneficial effect on students' evaluation of the training delivered, with a full 1.1-point difference, from 8.48 to 7.39.

The items where the difference was widest (highest Student's t and lowest p-values) were, logically, the ones directly related to project activities, such as self-assessment, teaching team, materials and the virtual course. Items such as the exam as an accurate measure of the final grade, the grading system, the need for prior knowledge or the study guide were unaffected.

TABLE V.
COURSE EVALUATION BY STUDENTS COMPLETING THE PROJECT (0-10)

	N	Mean	Std. deviation	Std. error
Prior knowledge required	28	7.8571	1.88982	.35714
Study guide: clear and detailed	28	7.9464	2.15741	.40771
Basic printed materials: clear and detailed	28	7.7679	2.29122	.43300
Virtual course supplementary material: useful	28	7.9464	2.15741	.40771
Self-assessment activities: useful	28	9.1071	1.39680	.26397
Virtual course: structured and organized	28	8.5714	2.39874	.45332
Teaching team: appropriate response to inquires	28	8.7500	2.40563	.45462
Virtual course: useful	28	8.0357	2.18974	.41382
Information for preparing final exam: helpful	28	8.1250	1.99826	.37764
Quarterlies: helpful for preparing final exam:	28	8.3036	1.80708	.34151
Final exam: accurate reflection of student knowledge	28	6.9643	2.99360	.56574
Overall satisfaction with materials	28	8.2143	1.78174	.33672
Overall satisfaction with teaching team	28	8.8393	1.59312	.30107
Overall satisfaction with grading system	28	7.2321	2.48507	.46963
Overall satisfaction with the training received	28	8.4821	1.57223	.29712

TABLE VI.
GRADE ON THE FINAL EXAM AND THE SELF-ASSESSMENT AND STATISTICAL COMPARISON OF THE TWO (PAIRED SAMPLE T TEST)

	Mean	N	Std. deviation	Std. error
Grade on exam	7.3038	26	2.41255	.47314
Self-assessment	7.8788	26	.77797	.15257

	Related difference					Student's t	df	Bilateral sig.
	Mean	Std. deviation	Std. error	95 % confidence interval for the difference				
				Lower	Higher			
Grade on exam – self-assessment	-.57500	2.09243	.41036	-1.42015	.27015	-1.401	25	.173

TABLE VII.
DEGREE OF SATISFACTION WITH THE SUBJECT: PROJECT PARTICIPANTS VS. GENERAL ENROLLMENT

	Survey score	Overall score	Student's t	df	Bilateral sig.	Diff. betw. means	95 % confidence interval for the difference	
							Lower	Higher
Prior knowledge required	7.86	7.34	1.448	27	.159	.51714	-.2157	1.2499
Study guide: clear and detailed	7.95	7.41	1.316	27	.199	.53643	-.3001	1.3730
Basic printed materials: clear and detailed	7.77	6.64	2.605	27	.015	1.12786	.2394	2.0163
Virtual course supplementary material: useful	7.95	6.95	2.444	27	.021	.99643	.1599	1.8330
Self-assessment activities: useful	9.11	7.47	6.202	27	.000	1.63714	1.0955	2.1788
Virtual course: structured and organized	8.57	7.08	3.290	27	.003	1.49143	.5613	2.4216
Teaching team: appropriate response to inquires	8.75	7.70	2.310	27	.029	1.05000	.1172	1.9828
Virtual course: useful	8.04	7.27	1.850	27	.075	.76571	-.0834	1.6148
Information for preparing final exam: helpful	8.13	7.16	2.555	27	.017	.96500	.1902	1.7398
Quarterlies: helpful for preparing final exam	8.30	7.60	2.060	27	.049	.70357	.0029	1.4043
Final exam: accurate reflection of student knowledge	6.96	6.81	.273	27	.787	.15429	-1.0065	1.3151
Overall satisfaction with materials	8.21	6.94	3.784	27	.001	1.27429	.5834	1.9652
Overall satisfaction with teaching team	8.84	7.53	4.349	27	.000	1.30929	.6915	1.9270
Overall satisfaction grading system	7.23	6.88	.750	27	.460	.35214	-.6115	1.3158
Overall satisfaction with the training received	8.48	7.39	3.676	27	.001	1.09214	.4825	1.7018

TABLE VIII.
COURSE EVALUATION BY STUDENTS PARTICIPATING IN THE PROJECT

		Abs. number	%
Would participate in the project again	No	0	0.0%
	Yes, for a higher grade	6	21.4%
	Yes, for credits	2	7.1%
	Yes, unconditionally	20	71.4%
The project should be officially implemented in all courses	No	3	10.7%
	Yes	25	89.3%

C. Expediency of extending this type of project to all the courses in the curriculum

Students proved to be highly appreciative of this type of projects, with 25 of the 28 contending that they should be an official component of all courses. All 28 stated that they would participate in similar projects and 20 (over 70 %) would do so in any case, even if it did not raise their grade or entail extra credits (Table VIII).

IV. DISCUSSION AND CONCLUSIONS

Transformation of the model used for university training is a reality perceptible both in the Bologna process and social demand[4]. Such transformation entails much more than merely applying ICTs to traditional education. The profound change required calls for student, professor and institutional engagement.

Three factors of significance to the process can be gleaned from the nine studies on the subject conducted by the authors over the last 10 years. The first has to do with students' perception of this new learning process. The advantage they see in the new model can affect their motivation as well as their opinion of the approach. The second is monitoring, which refers to the teaching activities and strategies applied. The third is students' ultimate satisfaction, which should be quantified not only concerning their grades, but more amply, to include the effort invested and learning acquired. The most recent project discussed here aims to identify the key aspects of each of these areas to help establish modern teaching models.

Initial perception was studied by means of a pre-project survey, subsequently compared to its post-project counterpart. Some of the items varied upward, with very high final scores: self-assessment (9.1), professor monitoring (8.75) and course structure and organization (8.57). Those findings revealed that students were not at the outset fully aware of the advantages to be reaped. If students cannot see the benefits of a new scenario, it may be more difficult to coax them out of their comfort zone and into engagement with change. The use of incentives would appear to constitute possible encouragement. The incentive applied in the project discussed (award of credits) was evaluated highly. The present authors feel, however, that the reward only makes sense if, as the other items analyzed showed, it induces student engagement with and adaptation to educational change, enabling them to harvest the learning benefits involved (70 % would participate in similar initiatives with no incentive). The reward should be a means, not an end in itself.

Classroom de-location carries substantial weight in the new scenario as a result of the application of ICTs. While that trend is highly beneficial for students, it also poses certain risks. UNED (paradigmatic institution in the use of blended learning for lifelong training with an extensive catalog of innovative tools) experience has shown that students' frequent failure to organize their time appropriately has an adverse effect on performance and motivation. That was revealed in the high scores recorded for monitoring, the second factor, particularly in connection with professor-furnished activity timetables. That instrument helped them manage their learning time. The variables defined by students as determinants for their course work included professor monitoring and course structure and organization (mentioned earlier), combined with the utility of the virtual course (8.03), support for preparing the final (8.12) and supplementary materials (7,94). The inference of these findings is that students forego the master class conceit in favor of an approach involving more self-management with ongoing professor support.

Students were particularly appreciative of self-assessments as part of the learning process. Whereas all enrollees in the two courses had a self-assessment exercise at the end of each lesson and two quarterly exams, project participants took an additional test after each lesson within a fixed timeframe. That item scored higher than any other under the heading 'monitoring'.

Statistically speaking, participants' overall evaluation of professors, training and materials (with a high Student's t and a low p-value) was indicative of high levels of satisfaction. This third factor can be sub-divided into two sub-factors: the grade earned (with an average of 7.3, higher than for the course overall) and the degree of engagement, effort and learning acknowledged by the students themselves. The scores discussed in the preceding paragraphs, together with students' perception that they learned more than mirrored in their grades, stand as proof of the latter.

The present findings might be used to deduce a relationship between satisfaction and dropout rates. One indicator of potential abandonment is the percentage of students who fail to take the final exam, in the near certainty that they would not pass. Here, 92.9 % of the participants took the final, compared to 54.7 % of course enrollees as a whole. Students who believe they have learned and are in a position to pass the exam might logically be thought to be more motivated and less prone to drop out, even if their final grade is not as high as wished (as they will try again). A relationship might be drawn between the teaching model proposed and student motivation. According to the surveys, all the participants who completed the project would repeat the experience and 90 % deemed that the model

[4] UNESCO estimates that in 2025 there will be 80 million more university students worldwide than at present: to rise to the challenges posed by that demand for training the roll-out of the resources required for "digital education" will need to be accelerated.

should be extended to all other courses in the curriculum.

That said, one-third of the participants dropped out of the project. Their reasons varied and their absence prevented the collection of reliable data from which to draw conclusions. Nonetheless, two suggestive particulars were observed in the initial survey. One was the mean level of education, for 78.9 % had no university degree. While that cannot be used as a reference, it might indicate that the greater the difficulty encountered, the higher the dropout rate. Continuous monitoring should consequently be intensified to prevent students from feeling lost. The second particular was age, for the youngest (more prone to dispersion than constant work) and the oldest adults (with fewer technological skills) were more prone to drop out.

Although this data refers to two specific courses, the analysis of the general issues (rather than technical procedures) shows that they might be extrapolated to other areas or at least serve as a reference for establishing teaching models based on significant features of blended learning. In any event, this study is not intended to be an entity in itself, but an introduction to a broader line of research. In addition to consolidating the features (incentives, professor monitoring, streamed online tutorials) found to be significant by testing them in other groups, such studies would be supplemented with other more modern technologies and methods to verify their appeal and potential. In that context, visual thinking tools to reduce study times and improve performance should be explored and combined with social networking and the mobile apps so deeply rooted in such environments. That approach would enhance general engagement and motivation in day-to-day learning.

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