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Research Article

E-Learning *versus* Classroom Learning for Acquiring Knowledge about Precarity in Medicine

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Abstract

The effect on knowledge levels immediately after a course on precarity in family medicine was assessed by comparing online learning against classroom learning, both followed by time for face-to-face discussion. Of 87 family medicine interns of the same class, 65 took part in the study and were evaluated, 34 being assigned to classroom learning and 31 to online learning. The increase in knowledge after the course was significantly higher in the online learning group (+27.8 points±11.2) than in the classroom group (+9.1 points±9.0) ($p<0.0001$).

Keywords: Online learning; Precarity; Family practice

Abbreviations

CNIL: Commission Nationale de l'Informatique et des Libertés; SD: Standard Deviation; T0: Test before the course; T1: Test immediately after the course

Background

Patients living in precarity have poorer health as well as poorer access to healthcare and disease prevention [1,2]. What's more, their management requires a blend of medical and social care which students have little training in. The use of online courses is gaining ground in initial and continuing medical education. Online learning maximizes the number of people who can be trained while minimizing training time. It also allows the learner to follow their course at times and locations of their choosing, with their learning made easier through illustrations and interactive links [3]. Online learning's cost-effectiveness is one advantage sometimes put forward, but it has rarely been studied [4]. Drawbacks include non-completion of the course, geographical isolation and poor interfaces. In a meta-analysis of the effectiveness of online learning among health professionals in 2008 [5], Cook et al. found it to be superior to no training at all but not significantly better than a lecture. Only a few authors have found online courses to be more effective than classroom-based ones [6,7].

Objective

Few learning resources are available to French medical students regarding the management of patients facing precarity. The result is poor knowledge of the issue and inappropriate management. Using

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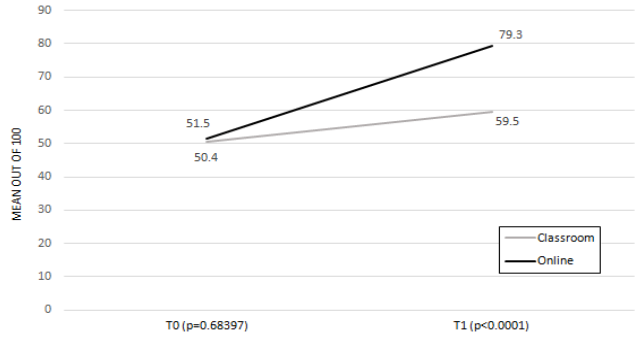

Figure 1: Changes in mean between T0 and T1 according to type of training.

a pragmatic approach, this study aimed to develop an online course and evaluate its effect on knowledge levels immediately after the course by comparing it against a classroom lecture.

Methods

We used a pragmatic approach to compare two groups of medical students in a prospective comparative single-center study. Approval was obtained from the Commission Nationale de l'Informatique et des Libertés (CNIL), a data protection agency, and the Sud-Est VI Clermont-Ferrand institutional review board. The online and classroom courses were put together by a committee of experts and a team of trainers. All family medicine interns of the class of 2016 (n=87) were invited to attend a course entitled "Health and Precarity" on March 21, 2019. The classroom and online learning groups were determined by alphabetical order. A time for discussion with the trainers was organized after the course for both groups. The online course was organized in the computer room of the faculty. Knowledge was assessed through a questionnaire involving 18 multiple-choice questions devised and validated by the expert committee. Of these 18 questions, 6 tested general knowledge of precarity in medicine (subgroup 1), 8 related to existing support services and benefits (subgroup 2) and 4 went back over specific cases of precarity in medicine (migrant patients, unaccompanied minors, etc.) (subgroup 3). In both groups, the questionnaires were given to the students before the training course (T0) and then immediately afterward (T1). The primary endpoint was improvement after the course, defined as the difference in points achieved on the questionnaires between T1 and T0. The secondary endpoint was the interns' satisfaction with the type of training. Statistical analyses were conducted using SAS 9.4® software at a two-tailed significance level of 5%. Quantitative variables were compared using Student's *t*-test, while any association between two quantitative variables was compared using Pearson's linear correlation coefficient.

Results

Pre-training knowledge was similar in the two groups (Table 1). The increase in knowledge after training was significant regardless of the type of training taken. It was higher in the online learning group (+27.8 points±11.2) than in the classroom group (+9.1 points±9.0 (p<0.0001) (Figure 1).

All online students improved their scores after the course (by between +6 and +50 points) whereas the classroom group's scores at the same time point differed by between -14 to +25 points, with four students achieving lower scores after the course. On subgroup analysis, a significant difference was observed (p<0.0001) between the online and classroom groups with regard to subgroups 1 (general knowledge) and 2 (support services and benefits) but not subgroup 3 (specific cases of precarity) (p=0.09). Overall satisfaction was significantly better in the online group (34.5/40 *vs.* 27.1/40, p<0.0001). Lastly, total cost for developing the online course was estimated at €18,000.

Conclusion

Our study shows a significantly higher increase in knowledge among online students than classroom students for learning about

Table 1: Profile of study populations and main results of the Precamed study.

Population studied	Total	Classroom group	Online group	P-value
Expected population, n	87	45	42	-
No-shows, n	22	11	11	-
Study population, n	65	34	31	-
Satisfaction questionnaire not completed, n	2	2	0	-
Age (mean ± SD)	28.1 ± 2.1	28.4 ± 2.6	27.7 ± 1.4	0.1867
Men, n (%)	25 (38%)	14 (41%)	11 (35%)	0.6375
Women, n (%)	40 (62%)	20 (59%)	20 (65%)	
Mean at T0 (points/100 ± SD)	50.9 ± 11.4	50.4 ± 10.6	51.5 ± 12.4	0.68397
Mean at T1 (points/100 ± SD)	69 ± 13.5	59.5 ± 10.9	79.3 ± 6.6	<0.0001
Improvement after course (T1-T0 ± SD)	+18 ± 13.7	+9.1 ± 9.0	+27.8 ± 11.2	<0.0001
Improvement after course for subgroup 1 (T1 -T0 ± SD)	-	+4.21 ± 13.51	+30.64 ± 15.31	<0.0001
Improvement after course for subgroup 2 (T1 -T0 ± SD)	-	+12.53 ± 16.97	+30.54 ± 16.23	<0.0001
Improvement after course for subgroup 3 (T1 -T0 ± SD)	-	+9.94 ± 3.60	+17.68 ± 11.08	0.09
Overall satisfaction	30.7/40	27.1/40	34.5/40	<0.0001

SD: Standard Deviation; T0: Test before the course; T1: Test immediately after the course; Subgroup 1: 6 questions tested general knowledge about precarity in medicine; Subgroup 2: 8 questions related to existing support services and benefits; Subgroup 3: 4 questions went back over specific cases of precarity in medicine (migrant patients, unaccompanied minors, etc.).

precarity in medicine. Satisfaction was also higher among online students. Online learning is therefore an effective tool that offers a number of advantages for both the learner and the trainer. However, there is still a need in online learning for time for face-to-face discussion, particularly with complex topics like handling precarity in medicine. Blended learning courses that combine classroom sessions with online learning have demonstrated their effectiveness and should be the preferred option for medical education [8,9].

That said, the drawbacks of online learning warrant consideration, such as their time-consuming nature owing to the high number of activities (acting and filming consultations) coupled with the high cost of producing them. Also worth bearing in mind is regular updating of the course, which is again time-consuming and costly. It must also be possible to check whether the online course has been followed by the students. Lastly, our study only investigated knowledge levels immediately after the course. Some studies have shown that at later time points the increase in knowledge is not significantly higher between online and classroom courses [10-12].

All in all, online learning is a useful alternative to classroom learning for teaching about precarity in medicine but it should be combined with time for face-to-face discussion. The cost and time it takes to put together and produce a good-quality online course must be borne in mind if incorporating it into third-level teaching of family medicine.

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