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PAPER

Effect of Hybrid Learning on Students' Academic Performance at the Higher Institute of Nursing Professions and Health Techniques of Oujda

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ABSTRACT

Following the restrictive security measures imposed by governments during the COVID-19 pandemic, education, like all other social sectors, has been radically disrupted. All educational systems have been urged to adopt distance learning to guarantee the continuation of training. The present study aims to determine the effect of the mode of learning used in training on students' academic performance at the Higher Institutes of Nursing Professions and Health Techniques (HINPHT) of Oujda in Morocco. Academic results and collected using an exploitation form are compared between two groups of students registered at the institution. The first group includes students who enrolled in September 2019 and were admitted during the COVID-19 containment period. These students initially received face-to-face training in the first semester but were later transitioned to online training during the lockdown period (n = 185). The second comparison group comprises students who received face-to-face training throughout (n = 413). The results of the present study reveal a significant increase in the average number of students who benefited from the hybrid training mode in all semesters. However, failure and dropout rates have increased in the hybrid mode compared to the face-to-face mode. This decrease in the number of students graduating within six semesters is notable in the hybrid mode compared to the control group. Further research can be conducted to examine the effect technological teaching devices may have on learner motivation and sense of control during training.

KEYWORDS

face-to-face learning, nursing, academic performance, hybrid mode

1 INTRODUCTION

The global pandemic context has led to major transformations at all levels. Indeed, due to the security and restrictive measures imposed by governments during the COVID-19 pandemic, education, like all other social organizations, has been radically disrupted. All educational systems have had to adopt distance learning to mitigate the

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loss of school time and continue providing training services [1]. The Higher Institutes of Nursing Profession and Health Techniques (HINPHT) in Morocco are part of this perspective and have opted for the distance training mode. Azmat *et al.* agree that international scientific results examining the impact of digital education on student learning need to demonstrate a clear and emerging consensus [2]. In this regard, the National Evaluation Instance at the Moroccan Higher Council for Education, Training, and Scientific Research, in partnership with UNICEF, organized a remote workshop in September 2021. During this event, the results of the study "Teaching in the Time of COVID-19" were presented and shared with the various stakeholders in education. Indeed, the results show that 36% of teachers believe that distance learning has adversely affected learning, 27.5% say the opposite, and 13.5% consider that it has no impact on student learning [1]. Similarly, the relationship between teaching and learning using technology and students' academic performance in nursing and health techniques must be explored more. Regarding this, the present study aims to determine the effect of distance-mode training on student academic performance. Therefore, what can be the difference between the academic results and the course per semester of the students who have benefited from face-to-face training and those having hybrid training at the level of the HINPHT of Oujda? Is there an association between the training mode and students' academic performance at HINPHT of Oujda?

2 MATERIALS AND METHODS

1. **Type of study**

   This retrospective analytical study examines the relationship between the training mode adopted to teach the curriculum of students enrolled in the Bachelor's degree cycle of nursing and health technical studies at HINPHT of Oujda and their academic performance.

2. **Study population**

   The target population consists of two groups. The first group includes all students in nursing and health techniques enrolled at HINPHT of Oujda from September 2013 to August 2018, from the first semester and having completed all semesters of their training at the same institution (n = 413). The second group consists of students enrolled in September 2019; these are the students who were admitted during the COVID-19 containment period. These students started their training with face-to-face sessions at the beginning of semester 1, but when the lockdown period began, they switched to online training (n = 185).

   This study excluded students who were suspended during the 2018–2019 academic year and transferred to another institute, or vice versa.

3. **Data Collection Method and Instrument**

   Using a data collection form, for each student enrolled in HINPHT of Oujda, we collected the following information: a) The grades obtained in each semester and each year since their admission to the institute; and b) general information collected by the unit of academic affairs of HINPHT of Oujda at each admission. The data collected from the academic records of students are: gender, nationality, and series of the baccalaureate, its mention, and its grade.

4. **Data Analysis**

   The collected data was analyzed in two parts using the data processing software Statistical Package for the Social Sciences (SPSS). The first part included a descriptive analysis of the data by calculating the frequencies of each variable and the averages for each semester for the two groups. The second part led to a comparison of the

averages to observe the differences between the performances of the HINPHT of Oujda students, taking into account the training mode. In this sense, a comparison test for independent samples was used. The distribution of the data was checked. The normality of the variables allowed the independent sample t-test.

5. **Ethical Considerations**

Since the included students will not be contacted due to the study's retrospective nature, they did not seek consent, but their data was coded. Furthermore, an agreement from the institution's director on where the study will take place has already been granted.

3 RESULTS

1. **Population description**

The study included a total of 853 participants, with 185 students having undergone blended training. 70.6% of the participants in the study are female. Additionally, 94.1% hold Moroccan nationality, and 57.9% possess a baccalaureate degree in experimental sciences, with 61.1% achieving with honor and highest honor. The nursing care (NC) stream accounts for 71.6% of the students in this institution. Multipurpose nursing students represent 33.4% of students enrolled at HINPHT of Oujda, followed by anesthesia and intensive care nursing students with 16.9% (refer to Table 1).

Table 1. Characteristics of HINPHT among Oujda students

Characteristics		Type of Training					
		Face-to-Face		Hybrid		Total	
		Frequency	(%)	Frequency	(%)	Frequency	(%)
Gender							
Male		131	31.7	45	24.3	176	29.4
Female		282	68.3	140	75.7	422	70.6
Nationality							
Moroccan		385	94.4	173	93.5	558	94.1
International		23	5.6	12	6.5	35	5.9
High school major							
Biology		278	68.8	62	33.5	340	57.9
Math or Physics		126	31.2	121	65.4	247	42.1
High school graduating mention							
Good/Very good		227	57.2	128	69.2	355	61.1
Average/over average		170	42.8	56	30.3	226	38.9
Nursing section (option)							
NC	PN	118	28.6	82	44.3	200	33.4
	AIC	76	18.4	25	13.5	101	16.9
	EIC	53	12.8	18	9.7	71	11.9
	MH	38	9.2	18	9.7	56	9.4
	Total	285	69	143	77.3	428	71.6

(Continued)

Table 1. Characteristics of HINPHT among Oujda students *(Continued)*

Characteristics		Type of Training					
		Face-to-Face		Hybrid		Total	
		Frequency	(%)	Frequency	(%)	Frequency	(%)
HT	LT	63	15.3	21	11.4	84	14
	RT	65	15.7	21	11.4	86	14.4
	Total	128	31	42	22.7	170	28.4

Note: NC: Nursing Care, PN: Polyvalent Nurse, AIC: Anesthesia and Intensive Care, EIC: Emergency and Intensive Care, HT: Health Techniques, LT: Laboratory Technician, RT: Radiology Technician, and MH: Mental Health.

2. Academic performance

According to the course descriptions, students who fail in an odd semester can still register for the even semester within the same academic year. Concerning blended training, 33 students were unable to obtain certification within the specified time limit outlined in the training descriptions (see Figure 1). This outcome may be attributed to students opting to discontinue their studies or being dismissed due to successive failures. It is worth noting that this figure could increase over time in the blended training mode, as some students who have failed are still actively enrolled. In contrast, in the face-to-face mode, only 15 students exit the institution without obtaining a diploma (see Figure 1).

It should be noted that the first semester is a period during which students encounter failures and engage in catch-up activities, irrespective of the training mode. In the face-to-face mode, 8% of students failed, and 34.9% passed only after completing the catch-up session. In the hybrid mode, 12.43% of students failed, and 65.41% passed the make-up session. On the other hand, it is not possible to compare the rates of catching up and success for the sixth semester. This is because students who experienced blended learning were absent due to demands and were automatically accepted to pass the catch-up session. In the classroom learning mode, the sixth semester is characterized by the lowest failure and make-up rates during the entire training, at 0.7% and 6.5%, respectively. However, the hybrid mode exhibits a zero-failure rate in the sixth semester (refer to Table 2).

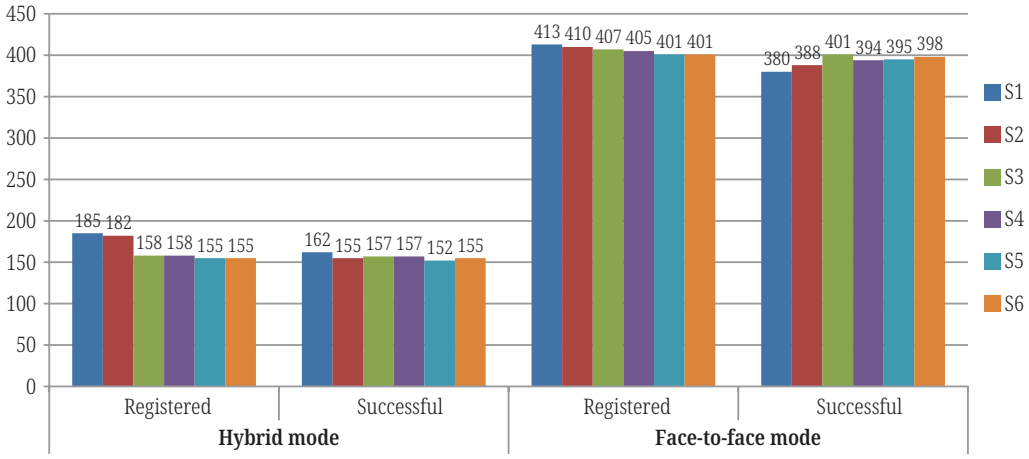

Fig. 1. Distribution of HINPHT of Oujda students, registered and having validated their semesters, according to the training mode

Table 2. HINPHT of Oujda student outcomes by semester/association between media use and success/performance

Results by Semester	Classroom Mode				Hybrid Learning			
	S/F	Frequency	Percentage	Cumulative Percentage	Frequency	Percentage	Cumulative Percentage	
Semester 1 results		0		0	0	0		.000
	F	33	8	8	23	12.43	12.43	
	SS	144	34.9	42.9	121	65.41	90.27	
	S	236	57.1	100	41	22.16	100	
Semester 2 results		3	0.7	0.7	6	3.24	3.2	.000
	F	22	5.3	6.1	4	2.16	5.41	
	SS	107	25.9	32	53	28.65	33	
	S	281	68	100	122	65.95	100	
Semester 3 results		6	1.5	1.5	11	5.95	5.95	.003
	F	6	1.5	2.9	2	1.08	7.03	
	SS	107	25.9	28.8	51	27.57	29.7	
	S	294	71.2	100	121	65.41	100	
Semester 4 results		8	1.9	1.9	9	4.86	4.86	.022
	F	11	2.7	4.5	3	1.62	6.49	
	SS	107	25.9	30.5	103	55.68	58.9	
	S	287	69.5	100	70	37.84	100	
Semester 5 results		12	2.9	2.9	28	15.14	15.14	.000
	F	6	1.5	4.4	3	1.62	16.76	
	SS	95	23	27.4	43	23.24	26.5	
	S	300	72.6	100	111	60	100	
Semester 6 results		112	2.9	2.9	30	16.21	16.21	.000
	F	3	0.7	3.6	0	0	16.21	
	SS	27	6.5	10.1	143	77.29	93.5	
	S	371	89.9	100	12	6.5	100	

Note: F: Failure, SS: Second session, and S: Success.

Taking into account the average of the semester, the students show a lower performance in the first semester in contrast to the last semester, which shows the best results of the whole academic career regardless of the mode of training; the class average of the first semester is 12.50 (Et = 1.86) for the students who benefited from hybrid training, while it is 12.32 (Et = 1.78) for those who were trained in classroom mode. These averages are not significantly different ($p > 0.05$). As for the average of the sixth semester, in the face-to-face learning mode, it is 13.88 (Et = 1.22), and in the hybrid mode, it is 14.39 (Et = 1.01). These means are significantly different ($p \leq 0.001$). The strength of this relationship is very weak (Eta2 = 0.037). Comparing the averages across all semesters, students who received blended training had an overall average of 13.82 (Et = 1.09), while those trained by face-to-face learning had an average of 13.14 (Et = 1.28). These means are significantly different ($p \leq 0.001$). Based on the analysis, the averages in the mixed mode are higher than those in the classroom learning mode across all semesters (refer to Table 3).

Table 3. The averages of each semester according to the training mode

Semester	Type of Training	n	Mean	Standard Deviation	T
S1	Hybrid learning	185	12.50	1.86	–1.149
	Face-to-face learning	413	12.32	1.78	
S2	Hybrid learning	182	13.78	2.10	–6.044***
	Face-to-face learning	407	12.74	1.83	
S3	Hybrid learning	158	13.72	1.41	–3.776***
	Face-to-face learning	407	13.23	1.38	
S4	Hybrid learning	158	13.44	1.41	–1.802
	Face-to-face learning	404	13.21	1.35	
S5	Hybrid learning	158	14.37	1.21	–8.112***
	Face-to-face learning	401	13.47	1.14	
S6	Hybrid learning	155	14.39	1.01	–4.644***
	Face-to-face learning	401	13.88	1.22	
Semester grade point average	Hybrid learning	155	13.82	1.09	–4.644***
	Face-to-face learning	398	13.14	1.28	

Note: * = $p \leq 0.05$; ** = $p \leq 0.01$; *** = $p \leq 0.001$.

Regarding blended learning, 33 students did not certify their training with a diploma within the prescribed time limit set by the training descriptions; 22 students failed during the six semesters, i.e., 11.9%; this rate is likely to increase depending on the performance demonstrated by the students who failed and who are still pursuing their training at the HINPHT of Oujda. In addition, 11 students chose to drop out or were revoked following their successive failures (5.9%). Additionally, ten students, equivalent to 2.4% of the total number of students, were unable to obtain a diploma attestation. The failure rate for this mode of training is 10.9%. The graduation rate for the classroom mode is 86.7%. Furthermore, the graduation rate for the hybrid mode cannot be calculated because some students have not yet completed their training (refer to Table 4).

Table 4. Association between course type and student's semester pathway

Semester Pathway	Type of Training				P
	Face-to-Face Learning		Hybrid Learning		
	Number	Percentage	Number	Percentage	
Less than 6	10	2.4	11	5.9	0.023
6	358	86.7	152	82.2	
More than 6	45	10.9	22	11.9	
Total	413	100	185	100	

4 DISCUSSION

Students' academic performance is evaluated in this article on several dimensions; semester validation is one of them. The following indicators are shown: pass rate, make-up rate, and failure rate. The average obtained during each semester

and the course duration are other quantitative dimensions that provide information on a learner's academic performance. According to the analysis of the results, the first semester is the semester in which students experience failure and remediation, regardless of the mode of study. This rhymes perfectly with what the General Inspectorate of National Education and the General Inspectorate of the Administration of National Education and Research stipulate, which also consider the first semester to be a key period during which the risk of dropping out is maximal [3]. Similarly, Paivandi admits that the first year appears to be the most difficult and is characterized by a high partial or total failure rate of 49% [4]. On the other hand, the failure rate (8% in face-to-face learning mode and 12.43% in hybrid mode) from the results of the present study remains low compared to what the literature reports. According to Paivandi, the causes of catching up or failure may be because the beginning of the university moment represents, for half of the students, a period marked by uncertainties and the search for meaning [4]. For the face-to-face learning mode, the sixth semester represents the semester in which the failure and make-up rates are the least observed during the course, at 0.7% and 6.5%, respectively. However, the sixth semester shows a zero-failure rate in blended mode. Taking into account the average of the semester, the students show lower performance in the first semester in contrast to the last semester, which shows the best results of the whole academic course regardless of the mode of training; the class averages obtained in hybrid mode are higher than those obtained in hybrid mode. This result is true for all semesters. When comparing averages across all semesters, students who received hybrid training had higher overall averages than students who were educated in the classroom mode ($p \leq 0.001$, Eta2 = 0.058). Indeed, the research literature is not unanimous regarding the effect of digital on student performance. Through their studies, Michaut and Roche, as well as Lieury *et al.*, demonstrate a moderate and negative effect of digital use on the grades obtained in exams [5, 6]. Michaut and Roche suggest that digital use has a minimal impact, noting that students are content with the course materials. Evaluations focus more on understanding the course content than relying on Internet research or digital skills acquired [5]. For their part, Dahmani and Ragni state that providing educational tools does not lead to increased student performance. On the contrary, such provisions, if not carefully monitored, may lower student performance [7]. However, the work of Alava and Morales and Azmat *et al.* admits the opposite [1, 8]. Alava and Morales demonstrated a positive correlation between young people's personal uses and academic performance [8]. Azmat *et al.* supports a statistically significant positive impact of "Mobile Class" (MC). In addition, they find a statistically significant effect of MCs of 7% of a standard deviation in the comparison group's French listening comprehension score. Based on the analysis of the results of this study, the averages in the mixed mode are higher than those in the face-to-face learning mode across all semesters [1]. Several studies have been conducted in the context of nursing education. However, they do not lead to unanimity regarding the differences in the effects of hybrid and face-to-face training. Some authors, such as Cao *et al.*, Gouifrane *et al.*, Castillo *et al.*, and Hung *et al.*, show that blended learning devices are more effective than traditional ones [9, 10, 11, 12]. Nevertheless, research findings by Devi *et al.* confirm that there is no difference between the effectiveness of blended instruction and the effectiveness of traditional instruction [13]. Furthermore, in the context of the COVID-19 pandemic, Sacré *et al.* examined the effectiveness of a hybrid device from a performance perspective for 85 students enrolled in the first year of the nursing training institute at the University of Clermont-Auvergne. This study confirmed that the performance of the nursing students between the pre-test and the post-test significantly increased and that skills

were thus acquired during the implementation of this type of training device [14]. Based on the results of their systematic review and meta-analysis, Du *et al.* assert that blended learning is not inferior (superior or at least equivalent) to traditional education in nursing education [15]. Based on the results of this study, it is clear that the loss rate in hybrid mode is higher than in face-to-face mode; a diploma could not attest to these students; either they dropped out or were dismissed due to their repeated failures. Therefore, examining students' preferences regarding training modalities is relevant. In this perspective, Papi and Glikman conducted a study between 2012 and 2014 that gathered 1640 first-time students at the University of Picardie Jules Verne, where they attended lectures and tutorials in different fields while preparing for the computer and Internet certificate (C2i) in hybrid training. Only two other teaching methods (which might be associated with lectures) are preferred: individual work with the teacher (75.7% of positive or very positive opinions) and teacher-student interactions (90.5%) [16]. Indeed, Jabraoui and Belmoudene conducted a study with 688 nursing and technical health students at HINPHT in Morocco to evaluate the quality of the distance learning system that the Higher Institutes of Nursing and Technical Health Professions in Morocco adopted during the COVID-19 pandemic [17]. It is evident from the results of this research that student satisfaction is strongly influenced by two requirements, which are: a) "the presence of audio/video recordings (in addition to textual recordings)" and b) "the quality or quantity of the pedagogical material made available online." The authors assert that these two requirements are considered indispensable for the quality of a distance learning system [17].

5 CONCLUSION

In conclusion, this study demonstrates a significant increase in average grades for students who underwent hybrid training across all semesters. Students face challenges such as failure and remediation in the first semester, irrespective of the training mode. Additionally, the number of students who graduated within six semesters decreased in hybrid mode. These findings stem from the circumstances in which the HINPHT of Oujda needed to prepare for such a training offering. Post-pandemic, HINPHT in the Kingdom of Morocco must reflect on the experience gained from the training they provided. Similar to higher education systems, they must showcase their adaptability to new circumstances that may arise. Such urgent and mandatory transformations position hybrid teaching arrangements as one solution to ensure the continuity of their services. Finally, further studies can be conducted to assess the impact of the Moodle platform implemented by the institution on student performance, motivation, and satisfaction with this type of system.

6 REFERENCES

[1] UNICEF, *Les résultats d'une évaluation : Enseignement au temps de Covid. Communiqué de presse*, 2021. https://www.unicef.org/morocco/communiqu%C3%A9s-de-presse/les-r%C3%A9sultats-dune-%C3%A9valuation-enseignement-au-temps-de-covid

[2] G. Azmat, D. Fougère, A. Lermite, C. Lobut, and A. Touw, *Note D'information: Évaluation multidimensionnelle de l'impact d'équipements numériques mobiles sur les apprentissages des élèves : Premiers résultats des effets du Plan numérique de 2015*. Direction de l'évaluation de la prospective et de la performance, Ministère de l'Éducation nationale, de la Jeunesse et des Sports, France, 2021.

[3] General Inspectorate of National Education and the General Inspectorate of the Administration of National Education and Research, *Pour une école plus proche et plus équitable,* 2006. https://www.vie-publique.fr/sites/default/files/rapport/pdf/064000846.pdf

[4] S. Paivandi, "Performance universitaire, apprentissage et temporalité des étudiants," *Revue française de pédagogie*, vol. 202, pp. 99–116, 2018. https://doi.org/10.4000/rfp.7546

[5] C. Michaut and M. Roche, "L'influence des usages numériques des étudiants sur la réussite universitaire," *Revue internationale de pédagogie de l'enseignement supérieur*, vol. 33, no. 1, 2017. https://doi.org/10.4000/ripes.1171

[6] A. Lieury, S. Lorant, and F. Champault, "Loisirs numériques et performances cognitives et scolaires : Une étude chez 27 000 élèves de la 3 e des collèges," *Bulletin de psychologie, Numéro*, vol. 530, no. 2, pp. 99–125, 2014. https://doi.org/10.3917/bupsy.530.0099

[7] M. Dahmani and L. Ragni, "L'impact des technologies de l'information et de la communication sur les performances des étudiants," *Réseaux*, vol. 155, no. 3, pp. 81–110, 2009. https://doi.org/10.3917/res.155.0081

[8] S. Alava and L. Morales, "Usages numériques non formels chez les jeunes et performance scolaire," *Nouveaux cahiers de la recherche en éducation*, vol. 18, no. 2, pp. 138–164, 2015. https://doi.org/10.7202/1036036ar

[9] W. Cao, L. Hu, X. Li, X. Li, C. Chen, Q. Zhang, and S. Cao, "Massive open online courses-based blended versus face-to-face classroom teaching methods for fundamental nursing course," *Medicine*, vol. 100, no. 9, p. e24829, 2021. https://doi.org/10.1097/MD.0000000000024829

[10] R. Gouifrane, H. Lajane, S. Belaaouad, S. Benmokhtar, S. Lotfi, F. Dehbi, and M. Radid, "Effects of a blood transfusion course using a blended learning approach on the acquisition of clinical reasoning skills among nursing students in Morocco," *International Journal of Emerging Technologies in Learning (iJET)*, vol. 15, no. 18, pp. 260–269, 2020. https://doi.org/10.3991/ijet.v15i18.15169

[11] J. Castillo, A. Gallart, E. Rodríguez, J. Castillo, and C. Gomar, "Basic life support and external defibrillation competences after instruction and at 6 months comparing face-to-face and blended training. Randomised trial," *Nurse Education Today*, vol. 65, pp. 232–238, 2018. https://doi.org/10.1016/j.nedt.2018.03.008

[12] I. C. Hung, K. Kinshuk, and N.-S. Chen, "Embodied interactive video lectures for improving learning comprehension and retention," *Computers & Education*, vol. 117, pp. 116–131, 2018. https://doi.org/10.1016/j.compedu.2017.10.005

[13] B. Devi, B. Khandelwal, and M. Das, "Comparison of the effectiveness of video-assisted teaching program and traditional demonstration on nursing students learning skills of performing obstetrical palpation," *Iranian Journal of Nursing and Midwifery Research*, vol. 24, no. 2, p. 118, 2019. https://doi.org/10.4103/ijnmr.IJNMR_35_18

[14] M. Sacré, M.-C. Toczek, F. Policard, G. Serres, C. Paulet, S. Petit, S. E. Neuville, and D. Lafontaine, "L'efficacité d'un dispositif d'enseignement hybride en fonction des caractéristiques des étudiants," *Revue internationale des technologies en pédagogie universitaire/International Journal of Technologies in Higher Education*, vol. 17, no. 2, pp. 9–29, 2020. https://doi.org/10.18162/ritpu-2020-v17n2-03

[15] L. Du, L. Zhao, T. Xu, Y. Wang, W. Zu, X. Huang, W. Nie, and L. Wang, "Blended learning vs traditional teaching: The potential of a novel teaching strategy in nursing education – A systematic review and meta-analysis," *Nurse Education in Practice*, vol. 63, p. 103354, 2022. https://doi.org/10.1016/j.nepr.2022.103354

[16] C. Papi and V. Glikman, "Les étudiants entre cours magistraux et usage des TIC," *Distances et médiations des savoirs. Distance and Mediation of Knowledge*, vol. 3, no. 9, 2015. https://doi.org/10.4000/dms.1012

[17] Y. Jabraoui and A. Belmoudene, "Evaluation de la qualité du dispositif d'enseignement à distance adopté par les Instituts Supérieurs des Professions Infirmières et Techniques de Santé au Maroc pendant la pandémie COVID 19," *Revue Marocaine de la Prospective en Sciences de Gestion*, vol. 4, no. 4, 2021. https://revues.imist.ma/index.php/RMPSG/article/view/32264

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