Journal of Dental Sciences 19 (2024) 1083–1086

Available online at www.sciencedirect.com

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journal homepage: www.e-jds.com

Original Article

Analysis of approved dental teaching projects in the teaching practice research program in 8 dental schools of Taiwan from 2018 to 2023

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Received 26 January 2024
Available online 3 February 2024

KEYWORDS
Dental education;
Digital dentistry;
Dental teaching research

Abstract *Background/purpose:* The teaching practice research program was initiated by Taiwan's Ministry of Education in 2018 to improve medical teaching quality. This study analyzed dental teaching projects conducted under this program from 2018 to 2023.
Materials and methods: Data of submitted and approved medical (including dental) teaching projects from 2018 to 2023 were obtained from the annual reports released by the program committee. The annual passing rates were calculated by dividing the number of approved dental teaching projects by the total number of approved medical teaching projects in the category of medical and healthcare sciences in a particular year. The 24 approved dental teaching projects were reviewed, classified into different topics in the dental field, and then reported.
Results: There were 24 approved dental teaching projects out of a total of 822 approved medical teaching projects from 2018 to 2023. The annual passing rates increased gradually from 2018 (1.4 %) to 2022 (3.9 %) and 2023 (3.8 %) with an overall mean passing rate of 2.9 % over a period of 6 years. Of the 24 approved dental teaching projects, digital dentistry was the most common teaching research topic (9 projects), followed by new teaching models (7 projects),

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https://doi.org/10.1016/j.jds.2024.01.021

3D technology (3 projects), endodontics (3 projects), dental histology (one project), and evidence-based method (one project).
Conclusion: Digital dentistry and new teaching models were the two predominant dental teaching research topics, suggesting that both are the modern trends in the dental education. However, the dental teaching research projects are still very limited in 8 Taiwanese dental schools.

Introduction

The teaching practice research aims to improve teaching quality and student learning outcomes by having the faculty conduct researches in the real-world educational settings. In Taiwan, the teaching practice research program was initiated in 2018 to support and encourage teaching practice research projects in the medical and dental schools. Through this competitive program, medical and dental school faculty can propose teaching research projects related to curriculum design, new teaching methods, educational technology, and more. The teaching research projects selected for funding are expected to improve teaching practices and transform students' learning in schools.[1]

To date, there has been no comprehensive study that analyzes the content of approved dental teaching research projects in the teaching practice research program in 8 dental schools of Taiwan from 2018 to 2023. In this study, we analyzed the 24 approved dental teaching research projects in the teaching practice research program in 8 Taiwanese dental schools between 2018 and 2023. This study consisted of the review of the total number of teaching research projects submitted to this program and the review of the approved dental teaching research projects related to the specific topics in the dental field, and from which the annual and the overall mean passing rates could be calculated from 2018 to 2023. The results of this analysis may provide information and recommendations for the promotion of high-quality dental teaching researches that align with the educational and instructional goals of the dental institutions.

Materials and methods

This study analyzed data on the dental teaching research projects submitted by 8 dental schools in Taiwan to the teaching practice research program from 2018 to 2023. The number of the total medical teaching research projects and the dental teaching research projects approved per year for each of the eight dental schools (labeled as A to H) was obtained from the annual reports released by the program committee of the teaching practice research program initiated by Taiwan's Ministry of Education in 2018.[2] The annual passing rates were calculated by dividing the number of approved dental teaching research projects by the total number of approved medical teaching research projects in the category of medical and healthcare sciences in a particular year from 2018 to 2023.

The content analysis focused specifically on the 24 approved dental teaching research projects during the 6-year period from 2018 to 2023. The title and content of each approved dental teaching research project was reviewed and further classified into different specific topics in the field of dentistry. In addition, the data analyzed were reported by the basic descriptive statistics to quantify annual and overall mean passing rates of the dental teaching research projects from 2018 to 2023. Given the small sample size and the objective of providing a broad summary of the research activity related to dentistry, sophisticated statistical analysis was not applied.

Results

Overall, there were 24 approved dental teaching research projects in the teaching practice research program in the eight dental schools of Taiwan between 2018 and 2023. The annual passing rates calculated by dividing the number of approved dental teaching research projects by the total number of approved medical teaching research projects in the category of medical and healthcare sciences in a particular year increased gradually from 1.4 % in 2018 to 3.9 % in 2022, and slightly decreased to 3.8 % in 2023 (Table 1).

Of the 24 approved dental teaching research projects in the eight dental schools in Taiwan, school A had the 8 approved projects, school B had 6 approved projects, schools C, D and E had 3 approved projects, school F had one approved project, and schools G and H had none of approved projects from 2018 to 2023 (Table 1). The annual number of approved dental teaching research projects increased from 2 in 2018 to 6 in 2022, and slightly dropped to 5 in 2023 (Table 1).

The 24 approved dental teaching research projects classified by different topics in the dental field from 2018 to 2023 are shown in Table 2. Digital dentistry was the most common research topic (9 projects), followed by new teaching models (7 projects), 3D technology (3 projects), endodontics (3 projects), dental histology (one project), and evidence-based method (one project) (Table 2).

Discussion

This analysis showed a growing tendency of involvement with the dental teaching research in the 8 dental schools in Taiwan. The number of approved dental teaching research projects increased steadily from 2018 (2 projects) to 2022 (6 projects), suggesting an enhanced interest in dental teaching practice research by the dental faculty in Taiwan

Table 1 Numbers of approved dental teaching research projects in the teaching practice research program in the 8 dental schools of Taiwan from 2018 to 2023.

Dental school	2018	2019	2020	2021	2022	2023	Total
A	1	0	1	2	2	2	8
B	1	2	1	0	1	1	6
C	0	0	1	1	1	0	3
D	0	0	0	0	1	2	3
E	0	1	0	2	0	0	3
F	0	0	0	0	1	0	1
G	0	0	0	0	0	0	0
H	0	0	0	0	0	0	0
Total	2	3	3	5	6	5	24
Passing rate[a]	1.4 % (2/140)	2.3 % (3/131)	2.6 % (3/116)	3.4 % (5/146)	3.9 % (6/156)	3.8 % (5/133)	2.9 % (24/822)

[a] Numbers of approved dental teaching research projects/Numbers of all approved medical teaching research projects in the category of medical and healthcare sciences.

Table 2 The 24 approved dental teaching research projects classified by different topics in the dental field from 2018 to 2023.

Dental field	2018	2019	2020	2021	2022	2023	Total
Digital Dentistry	1	1	1	1	4	1	9
New teaching model	1	0	1	3	1	1	7
3D technology	0	1	0	1	1	0	3
Endodontics	0	1	0	0	0	2	3
Dental histology	0	0	0	0	0	1	1
Evidence-based method	0	0	1	0	0	0	1
Total	2	3	3	5	6	5	24

and institutional support for this scholarly approach to instructional improvement.

The prevalence of the dental teaching research projects that incorporated digital dentistry in dental technology and developed new teaching models for dental students reflected the need of more advanced dental skills for contemporary dental practice and the need of new teaching methods for spreading a great amount of new dental knowledge. Digital dentistry encompasses technologies such as computer-aided design/computer-aided manufacturing (CAD/CAM), virtual reality (VR), augmented reality (AR), artificial intelligence (AI), and three-dimensional (3D) printing.[3] Several studies have demonstrated the value of VR and AR technologies to improve the psychomotor skill training in areas such as tooth extraction, implant placement, and other procedures.[4—6] A systematic review study found that VR-based education is as effective as conventional teaching methods in multiple dental fields.[7] Integrating these emerging tools into the dental curriculum aligns with the goals to advance technical capabilities and clinical decision-making skills of dental graduates.[8] The focus on active teaching models also echoes evidence favoring hands-on, skills-based techniques for effective learning in dentistry.[9]

Applications of AI are rapidly growing in dentistry, with models developed to improve the diagnosis, treatment planning, and prediction of clinical outcomes in many dental specialties.[10—12] However, barriers remain, including regulatory approval, cost, clinician training, and data limitations before AI can be widely implemented clinically.[13,14] Thoughtful integration of AI tools while focusing human expertise and doctor—patient relationships will be the key to realize the potential of these innovations.[15]

Although these dental research projects provided examples of innovation, the general scarcity of research in the dental teaching practice remains a concern. Expanding participation and increased passing rates would strengthen the dental educational evidence base researches. Increased incentives and supporting systems may be needed to further integrate dental teaching practice research within institutional priorities and professional development of dental faculty. Comparison of the dental teaching research results among different dental schools can also highlight programs with robust models that can potentially be emulated.

This study has limitations due to the small sample size and quantitative focus. Additional researches through surveys or interviews may provide more information on the facilitators and barriers to conduct this dental teaching research among dental educators. As the future of dental education will undoubtedly be shaped by emerging technologies such as AI and VR/AR, analyzing dental teaching research projects can ensure that dental curricula evolve appropriately to provide dental graduates with relevant competencies.[8,16] Continued technology adoption paired with high-quality dental teaching practice research will be the key to advance dental education.

Declaration of competing interest

The authors have no conflicts of interest relevant to this article.

Acknowledgements

None.

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