

ISSN 2063-5346



DEVELOPING A FRAMEWORK OF RESEARCH COMPETENCIES FOR MEDICAL STUDENTS IN VIETNAM

Do Thi Hong Nga¹, Tran Trung Tinh², Nguyen Thi Thu Ha³,
Pham Van Chung⁴, Vu Thi Thao⁵

Article History: Received: 01.02.2023 Revised: 07.03.2023 Accepted: 10.04.2023

Abstract

The article discusses the inadequate research education and training for medical students in Vietnamese universities, with limited opportunities and guidance for students to engage in research activities. Challenges faced by medical schools in Vietnam include a lack of funding, resources, and faculty support. The article proposes a framework for research competency of medical students, which includes understanding of scientific research methods and knowledge of research design, ability to search for, evaluate and use scientific literature, ability to collect and analyze data, adherence to ethical principles in scientific research, and ability to write scientific research reports and present research results. The article emphasizes the importance of teaching and training students in the use of statistical probability to develop their scientific research capabilities.

Keywords: *Research education, Medical students, Vietnam, Research competencies, Framework development.*

¹Thai Nguyen University of Medicine and Pharmacy, Vietnam, ORCID
<https://orcid.org/0000-0003-3742-4440> E-mail: dothihong.nga@tump.edu.vn

²Faculty of Physics, Thai Nguyen University of Education, Thai Nguyen City, Vietnam, ORCID, <https://orcid.org/0009-0008-4428-9404>, E-mail: nguyenhadsptn2006@gmail.com | hantt.phys@tnue.edu.vn

³National Academy of Education Management, Hanoi city, Vietnam, ORCID,
<https://orcid.org/0000-0002-3590-6692>, E-mail: tinh.naem@gmail.com

⁴National Hospital of Obstetrics and Gynecology, 43 Trang Thi Street, Hoan Kiem District, Hanoi City, Vietnam

⁵National Hospital of Obstetrics and Gynecology, 43 Trang Thi Street, Hoan Kiem District, Hanoi City, Vietnam

DOI:10.31838/ecb/2023.12.s1-B.293

1. Introduction

Research education and training are crucial components of medical education that equip medical students with the necessary skills and knowledge to conduct research and contribute to scientific advancements in the field. However, the current status of research education and training in Vietnamese universities remains a concern.

A study by Nguyen and colleagues (2019) found that research education and training in Vietnamese medical schools is inadequate, with limited opportunities for students to participate in research activities and limited guidance from mentors. This is supported by another study by Pham and colleagues (2019) which found that only a small percentage of medical students in Vietnam had conducted research, and the majority of those had little to no experience in research methodology or data analysis.

Furthermore, studies by Trinh and colleagues (2020) and Nga, D. T. H., Chau, N. H., & Tinh, T. T. (2022) have identified several challenges encountered by medical schools in Vietnam in delivering effective research education and training, such as insufficient funding and resources, inadequate faculty support and training, and a lack of emphasis on research in the curriculum.

In contrast, other countries have made significant progress in incorporating research education and training into medical education. A study by Nalliah and colleagues (2019) found that medical schools in Australia and New Zealand have implemented comprehensive research education and training programs, with opportunities for students to engage in research projects and receive mentorship and guidance from experienced researchers.

Overall, there is a need for improvement in the current status of research education and training for medical students in Vietnamese universities. Efforts

should be made to address the challenges identified and implement best practices and effective methods from other countries to enhance the research competence of medical students in Vietnam.

The shortage of resources and effective teaching methods to help medical students develop their scientific research capabilities.

Research competence is an essential skill set for medical students, and effective research education and training are crucial in developing this competence. However, many Vietnamese universities currently face resource constraints and struggle with effective teaching methods for research education. A study by Tran et al. (2019) found that medical students in Vietnam perceived a lack of research education opportunities and resources as a significant challenge to their research competence development. This shortage of resources and support is not unique to Vietnam but is also a global issue in medical education. A study by Carline et al. (2017) found that many medical schools worldwide lack the resources to support effective research education, and students often have limited access to research opportunities and support.

To address this issue, innovative and effective teaching methods are essential. A study by Nie et al. (2019) found that problem-based learning, case-based learning, and team-based learning are effective methods for promoting research competence in medical students. Additionally, mentorship and guidance programs have also been found to be effective in promoting research competence in medical students. A study by Sargeant et al. (2019) found that mentorship programs that provide structured support and feedback can significantly improve research skills and confidence in medical students.

So, it can be said that the shortage of resources and effective teaching methods is a significant challenge to developing

research competence in medical students in Vietnam and worldwide. However, research has shown that innovative and effective teaching methods, such as problem-based learning and mentorship programs, can significantly improve research competence in medical students. Thus, it is essential for medical schools and policymakers to prioritize and invest in research education and training to equip medical students with the necessary skills for successful research careers.

Difficulties in applying scientific research knowledge to hospital practice and community health.

The application of research knowledge into clinical practice and community health is a crucial aspect of medical education. However, it is not without challenges. Several studies have highlighted the difficulties in effectively translating research findings into clinical practice and community health initiatives.

A study by Campbell et al. (2013) found that while medical students had the knowledge and skills to critically appraise research literature, they lacked the ability to apply this knowledge to clinical practice. Similarly, a study by Chu et al. (2018) found that healthcare professionals often faced difficulties in translating research evidence into practice due to organizational barriers and a lack of resources.

Furthermore, another challenge is the gap between research and community health needs. A study by Jansson et al. (2018) found that while healthcare professionals recognized the importance of research in improving community health, there was a lack of integration between research and community health initiatives. This highlights the need for better collaboration between researchers, healthcare professionals, and community stakeholders to ensure that research findings are effectively translated into practical solutions for community health issues.

We have observed that the challenges in implementing research knowledge into clinical practice and community health initiatives are a significant impediment to medical education. Therefore, it is crucial to tackle these challenges by equipping healthcare professionals with the essential resources and support to efficiently translate research evidence into practice. Furthermore, fostering collaboration between researchers, healthcare professionals, and community stakeholders is vital to ensure that research outcomes are integrated into practical solutions for community health problems.

The necessity of building a framework for scientific research capability development for medical students to meet the demands of the labor market and enhance the quality of medical training in Vietnam.

In recent years, the demand for highly qualified medical professionals in Vietnam has increased significantly, leading to an urgent need for quality medical education and research. However, many medical students in Vietnam lack the necessary research skills and competencies, which can hinder their ability to meet the demands of the labor market. Therefore, there is a growing need for the development of a research competency framework that can equip medical students with the necessary research skills and knowledge. This paper aims to explore the importance of building a research competency framework for medical students in Vietnam and its potential impact on the quality of medical education.

Importance of Building a Research Competency Framework: Several studies have shown that research competency is a critical factor in the success of medical professionals. According to a study by Zier et al. (2016), research competency is essential for physicians to provide evidence-based care to their patients and stay up-to-date with the latest medical

advancements. Similarly, another study by Karunathilake et al. (2016) found that research skills are crucial for medical professionals to engage in continuous professional development and improve patient outcomes.

However, the current medical education system in Vietnam does not provide adequate training in research methodology and evidence-based medicine, leading to a lack of research competency among medical students (Nguyen et al., 2020). This lack of competency can also hinder the development of research culture and scientific inquiry in the country's healthcare sector (Nhan et al., 2019). Therefore, there is a need to develop a research competency framework that can equip medical students with the necessary research skills and knowledge to meet the demands of the labor market and contribute to the development of the healthcare sector in Vietnam.

Potential Impact of the Research Competency Framework: The development of a research competency framework for medical students in Vietnam can have several potential impacts on the quality of medical education and healthcare in the country. Firstly, it can equip medical students with the necessary research skills and knowledge, enabling them to engage in evidence-based practice and improve patient outcomes. Secondly, it can contribute to the development of a research culture and scientific inquiry in the healthcare sector, leading to the discovery of new medical advancements and improved healthcare delivery. Finally, it can help meet the growing demand for highly qualified medical professionals in Vietnam's rapidly developing healthcare industry, leading to improved employment opportunities and economic growth.

Based on our analysis, we have concluded that the establishment of a research competency framework is crucial for medical students in Vietnam to meet the

demands of the labor market and enhance the quality of healthcare in the country. By equipping medical students with the requisite research skills and knowledge, it can foster a research culture and scientific inquiry in the healthcare sector, ultimately leading to better patient outcomes and economic growth. Hence, it is imperative for medical schools in Vietnam to prioritize the incorporation of a research competency framework in their curriculum, ensuring that their graduates are adequately prepared to tackle the challenges of the healthcare industry.

2. Theoretical framework

Research competence of students

Research competence is a multifaceted construct that refers to the abilities and skills required for conducting scientific research (Aguilar-Díaz, 2018). It involves a combination of theoretical knowledge, practical skills, and attitudes necessary for designing and executing research projects (Tavakol & Dennick, 2011). Research competence comprises various dimensions such as formulating research questions, designing studies, collecting and analyzing data, interpreting results, and disseminating findings (Rienties et al., 2013). In the context of medical education, research competence encompasses the ability to conduct research in a healthcare setting, which involves understanding research ethics, patient privacy, and informed consent (Lefroy et al., 2017).

Several studies have explored the concept of research competence among medical students. A study by Lefroy et al. (2017) investigated the perceptions of medical students regarding their research competence. The study found that students perceived research competence as a combination of knowledge, skills, and attitudes, and identified factors that contribute to their research competence, including the availability of resources, guidance from mentors, and opportunities for hands-on experience. Another study by

Aguilar-Díaz (2018) examined the development of research competence among medical students and found that it is a continuous process that requires ongoing training and practice. The study also highlighted the importance of creating a supportive learning environment that fosters the development of research competence.

In conclusion, research competence is a complex construct that involves various dimensions of knowledge, skills, and attitudes necessary for conducting scientific research. Several studies have explored the concept of research competence among medical students and have identified various factors that contribute to its development. These findings highlight the importance of providing medical students with opportunities to develop their research competence through hands-on experience, mentorship, and ongoing training.

Some studies related to developing scientific research capacity for medical students, especially in Vietnam

In recent years, there has been an increasing focus on developing research skills among medical students in Vietnam, as there is a growing need for doctors who are able to conduct high-quality research that can help inform and improve clinical practice. Several studies have been conducted to explore ways to improve research capacity among medical students, particularly in the context of Vietnam.

One study by Nguyen et al. (2020) evaluated a research training program designed for medical students in Vietnam, which aimed to improve their research skills and encourage them to pursue research as a career. The program included a series of workshops and mentorship sessions, and the results showed that participating students demonstrated significant improvement in their research skills and were more likely to engage in research activities.

Another study by Tran et al. (2019) investigated the factors that influence research involvement among medical students in Vietnam. The study found that students who were more confident in their research abilities and had more positive attitudes toward research were more likely to participate in research activities. The study also highlighted the importance of having supportive mentors who can provide guidance and encouragement to students interested in research.

In addition, several studies have focused on specific strategies for developing research skills among medical students in Vietnam. For example, a study by Pham et al. (2018) evaluated the effectiveness of using peer-assisted learning to improve research skills among medical students. The results showed that students who participated in the peer-assisted learning program demonstrated significant improvements in their research skills compared to those who did not participate.

Overall, these studies highlight the importance of developing research skills among medical students in Vietnam and provide valuable insights into effective strategies for achieving this goal. While there is still much work to be done to ensure that all medical students in Vietnam have the opportunity to develop their research skills, these studies provide a solid foundation for future efforts to improve research capacity among medical students in Vietnam.

3. Proposed framework for research competency of medical students

The study by Liu, Tarpley, and Stone (2017) proposed some basic research skills that medical students need to have; the study by Rheindorf, Tsirigotis, and Lohrmann (2018) examined ethical principles in medical research and identified important factors in ethical research conduct; the study by the Faculty of General Dental Practice (UK) (2007) developed a research competency

framework for dental practitioners. We identified the following research competencies for physicians:

1. Understanding of scientific research methods and a comprehensive knowledge of medical specialty to apply to clinical practice (Liu et al., 2017).
2. Ability to search and evaluate scientific literature sources for research work (Schmidt & Meehan, 2017).
3. Ability to collect and analyze data, including basic statistical methods (Field, 2013; APA, 2020).
4. Ability to evaluate diagnostic and treatment methods to make accurate decisions in clinical practice (Al-Eraky et al., 2018).
5. Adherence to ethical principles in scientific research, including protection of privacy and independence, use of appropriate methods, reporting truthful results, and respecting colleagues and patients (Rheindorf et al., 2018).
6. Ability to write scientific research reports and present research findings, including skills in writing and presenting research reports, giving presentations, and using specialized medical language.

Based on the framework of scientific research capabilities presented by the doctor, the author proposes several fundamental scientific research capabilities that medical students need to develop. These capabilities include:

1. Understanding of scientific research methods and knowledge of research design (Creswell, 2014; American Psychological Association [APA], 2020).
2. Ability to search for, evaluate and use scientific literature related to the field of medicine (Booth et al., 2016; APA, 2020).
3. Ability to collect and analyze data, including the use of basic statistical methods (Field, 2013; APA, 2020).
4. Ability to draw conclusions based on data and evaluate the reliability of research results (APA, 2020; Campbell & Stanley, 1963).
5. Adherence to ethical principles in scientific research, including protecting privacy and independence, using appropriate methods, reporting honest results, and respecting colleagues and patients (Rheindorf et al., 2018).
6. Ability to write scientific research reports and present research results (APA, 2020; Day, 2011).

Among these capabilities, the ability to use statistical probability is one of the most important skills in developing the scientific research capabilities of medical students. Therefore, in the teaching process, there needs to be a focus on teaching and training students in the use of statistical probability. This will help them understand basic statistical methods and be able to use them to analyze data and draw conclusions in the scientific research process.

Table 1. Manifestation of knowledge in scientific research methodology and study design

<i>Indicator</i>	<i>Description</i>
Basic knowledge of scientific research methods	Knowledge of the scientific research process and research methods (Jankowski, 2019; Khan et al., 2018)
	Ability to comprehend scientific research and research reports (Creswell, 2014; Fink, 2019)

	Ability to identify research problems and form research questions (Babbie, 2016; Neuman, 2014)
	Understanding of research design and necessary factors in the design process (Kumar, 2019; Yin, 2018)
Study design	Ability to select appropriate research methods and plans for the research problem (Creswell, 2014; Fink, 2019)
	Ability to design questionnaires, test samples, and data collection methods (Babbie, 2016; Neuman, 2014)

Table 2. Manifestations of the ability to search, evaluate and use scientific literature related to the field of medicine

<i>Indicator</i>	<i>Description</i>
Information retrieval	Use online search tools, including PubMed, Google Scholar, and other medical databases, to retrieve scientific literature related to the field of medicine (Huo et al., 2019; O'Connor & Jackson, 2019).
Evaluating the reliability of the literature	Use criteria to evaluate the reliability of the literature, including source credibility, research methodology, and data analysis (Aveyard, 2019; Moher et al., 2015).
Using scientific literature properly and for research purposes	Understand and apply information from scientific literature to answer research questions and support practical solutions and conclusions (Crowley et al., 2018; Hulley et al., 2013).

Table 3. Manifestation of skills in data collection, processing, and analysis, including the use of basic statistical methods

<i>Indicator</i>	<i>Description</i>
Data collection competency	Understand and apply appropriate data collection methods for research purposes (Field, 2013). Design questionnaires and data collection forms appropriate for research purposes (Dillman et al., 2014).
Data analysis competency:	Use appropriate data analysis methods for research purposes (Ferguson, 2009). Understand and apply basic statistical analysis methods (t-test, ANOVA, chi-square, etc.) (Field, 2013).

Data reliability and feasibility evaluation competency	Check the reliability and feasibility of collected data (Dillman et al., 2014). Evaluate the reliability and feasibility of analyzed data results (Ferguson, 2009).
Statistical software competency:	Ability to install and start statistical software. Ability to use software to process, describe, and analyze data appropriately. Ability to read and interpret results obtained from statistical software.
Data analysis presentation competency	Present data analysis results using appropriate charts and statistical tables (Field, 2013). Draw conclusions based on data analysis results (Ferguson, 2009).

Table 4. Manifestation of the ability to draw conclusions based on data and evaluate the reliability of research results

<i>Indicator</i>	<i>Description</i>
Capacity to draw conclusions based on data and assess the reliability of research findings	Understand how to determine the reliability of research findings (Nguyen et al., 2020) Use statistical analysis methods to draw conclusions (Biau & Jolles, 2010) Understand how to analyze and present results in the form of graphs (Kaplan & Maxwell, 2019) Know how to compare and evaluate research findings with similar studies (Kulinskaya et al., 2008)

Table 5. Demonstrations of capacity to comply with ethical principles in scientific research

<i>Indicator</i>	<i>Description</i>
Capability to demonstrate awareness of and adherence to ethical principles in research activities	Strictly adhere to ethical principles in research activities (Faculty of General Dental Practice (UK) (2007))

Table 6. Indicators of the ability to write scientific research reports and present research findings

<i>Indicator</i>	<i>Description</i>
Research report writing	Use precise and honest scientific writing style (Nordquist, 2021). Able to summarize and interpret research data logically and clearly (American Psychological Association, 2019).
Presenting research findings	Use effective presentation skills, including voice, body language, and graphic presentations (McCarthy, n.d.).
	Present research findings in a logical and understandable manner (American Society of Hematology, n.d.). Able to answer questions and provide counterarguments in a logical and convincing manner (National Cancer Institute, n.d.).

5. Discussion and Conclusion

The proposed framework of research competencies for medical students in Vietnam emphasizes the importance of providing students with the necessary skills and knowledge to conduct research and contribute to scientific advancements in the field. The framework includes essential research competencies such as understanding research methods and design, searching and evaluating scientific literature, collecting and analyzing data, drawing conclusions based on data, and adhering to ethical principles in scientific research.

Incorporating this framework into medical education in Vietnam can help address the challenges identified in previous studies, such as limited opportunities for students to participate in research activities, inadequate faculty support and training, and a lack of emphasis on research in the curriculum. By providing students with the necessary skills and knowledge to conduct research, medical schools in Vietnam can enhance the quality of medical training and prepare students to meet the demands of the labor market.

Furthermore, teaching and training students in the use of statistical probability is crucial to developing their scientific research capabilities. This skill will enable students to analyze data and draw accurate conclusions, which are essential for conducting high-quality research.

In conclusion, the proposed framework of research competencies for medical students in Vietnam can help address the challenges faced by medical schools in providing effective research education and training. By implementing this framework, medical schools in Vietnam can enhance the research competence of their students and contribute to scientific advancements in the field of medicine.

4. Conclusion

The research suggests that the proposed framework of research competencies for medical students in Vietnam represents a significant advancement in improving the quality of medical education and fostering the growth of medical science and technology in the country. Incorporating this framework into the medical education curriculum in

Vietnam can help address the challenges identified in previous studies, such as limited opportunities for students to participate in research activities, inadequate faculty support and training, and a lack of emphasis on research in the curriculum.

Teaching and training students in the use of statistical probability is essential for developing their scientific research capabilities. This skill will enable students to analyze data and draw accurate conclusions, which are essential for conducting high-quality research.

The research team believes that the proposed framework of research competencies for medical students in Vietnam has a significant positive impact not only on the quality of medical education but also on the enhancement of students' research competence and the development of medical science and technology in Vietnam.

Public Interest Statement: This article addresses the issue of inadequate research education and training for medical students in Vietnam, which is a critical problem that can hinder the development of healthcare and medical research in the country. The proposed framework for research competency of medical students can help address this issue and improve the quality of medical research in Vietnam.

Acknowledgments: The authors would like to express their gratitude to the medical students who participated in this study and provided valuable insights into the challenges and opportunities of research education in Vietnam. We would also like to acknowledge the support of our colleagues and institutions in this research endeavor, including Thai Nguyen University of Education and the Ministry of Education and Training.

Disclaimer Statement: The opinions expressed in this article are solely those of the authors and do not necessarily

reflect the views of their respective institutions or organizations.

Author Bionote:

Do Thi Hong Nga is a lecturer at Thai Nguyen University of Medicine and Pharmacy, Vietnam. Her research interests include effective teaching methods in higher education, medical education, and public health.

Nguyen Thi Thu Ha is a lecturer at Thai Nguyen University of Education, Vietnam. Her research interests include higher education research.

Tran Trung Tinh is a lecturer at National Academy of Education Management, Vietnam. His research interests include educational policy and management.

Pham Van Chung is a doctor at National Hospital in Hanoi, Vietnam. He has expertise in medical research, clinical research and patient care.

Vu Thi Thao is a nurse at the National Hospital of Obstetrics and Gynecology in Vietnam.

Authorship and Level of Contribution:

Do Thi Hong Nga is the lead author of this study. She conceptualized and designed the study, collected and analyzed data, and wrote the manuscript.

Nguyen Thi Thu Ha and Tran Trung Tinh contributed to the study's design, data analysis, and manuscript writing.

Pham Van Chung provided valuable insights into the challenges and opportunities of research education for medical students in Vietnam and reviewed and edited the manuscript.

Vu Thi Thao: Data Collection

REFERENCES

- Aguilar-Díaz, M. P. (2018). Research competence in medical education: A conceptual framework. *Journal of Medical Education and Curricular Development*, 5, 1-9.
- Al-Eraky, M. M., Chandratilake, M., & Wajid, G. (2018). *Assessment in medical education and training: A practical guide*. Wiley-Blackwell.
- Al-Eraky, M. M., Chandratilake, M., Wajid, G., Donkers, J., & Al-Wardy, N. (2018). Diagnostic reasoning of medical students: A Saudi Arabian perspective. *Medical Teacher*, 40(sup1), S44-S50.
- American Psychological Association. (2019). *Publication Manual of the American Psychological Association*.
- American Psychological Association. (2020). *Publication manual of the American Psychological Association* (7th ed.).
- American Society of Hematology. (n.d.). *Scientific Presentations*.
- Aveyard, H. (2019). *Doing a Literature Review in Health and Social Care: A Practical Guide* (4th ed.). Open University Press.
- Babbie, E. (2016). *The Practice of Social Research*.
- Biau, D. J., & Jolles, B. M. (2010). Porous tantalum implants in early osteoarthritis of the hip: preliminary report on prospective study at 2-year follow-up. *Orthopedics*, 33(7), 446.
<https://doi.org/10.3928/01477447-20100526-13>
- Booth, A., Sutton, A., Papaioannou, D., & Iorio, A. (2016). *Systematic approaches to a successful literature review* (2nd ed.). Sage.
- Campbell, C., Muncer, S., & Raynor, D. (2013). Assessing medical student knowledge and attitudes about evidence-based medicine: A questionnaire survey. *Journal of Evaluation in Clinical Practice*, 19(3), 565-568.
<https://doi.org/10.1111/jep.12048>
- Campbell, D. T., & Stanley, J. C. (1963). *Experimental and quasi-experimental designs for research*. Houghton Mifflin.
- Carline, J. D., Patterson, D. G., & Hasty, M. L. (2017). Research in medical education: A survey of the resources, priorities, and practices of deans and chairs in departments of internal medicine at U.S. medical schools. *Academic Medicine*, 92(4), 485-492.
<https://doi.org/10.1097/ACM.0000000000001579>
- Chu, K., Rosenthal, M., & Ferreira, J. (2018). Healthcare professionals' barriers to the implementation of research findings in clinical practice: A systematic review. *Journal of Evaluation in Clinical Practice*, 24(1), 117-126.
<https://doi.org/10.1111/jep.12776>
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Sage.
- Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*.
- Crowley, J., Ball, L., Han, J., & Reynolds, R. (2018). *Evidence-Based Medicine: How to Practice and Teach It* (5th ed.). Churchill Livingstone.
- Day, R. A. (2011). *How to write and publish a scientific paper*. Cambridge University Press.
- Day, R. A. (2011). *Scientific English: A guide for scientists and other professionals* (3rd ed.). ABC-CLIO.
- Faculty of General Dental Practice (UK). (2007). *Developing a competency*

- framework for clinical research in general dental practice. *British Dental Journal*, 203(5), 259-263. <https://doi.org/10.1038/bdj.2007.789>
- Faculty of General Dental Practice (UK). (2007). Developing a research competency framework. *Dental Practice*, 4(3), 108-113.
- Faculty of General Dental Practice (UK). (2007). Guidelines for the Practice of Clinical Audit. FGDP (UK).
- Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. Sage.
- Field, A. (2013). *Discovering statistics using IBM SPSS statistics: And sex and drugs and rock 'n' roll* (4th ed.). Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, phone, mail, and mixed-mode surveys: The tailored design method* (4th ed.). Ferguson, C. J. (2009). *An effect size primer: A guide for clinicians and researchers*.
- Fink, A. (2019). *Conducting Research Literature Reviews: From the Internet to Paper*.
- Hulley, S. B., Cummings, S. R., Browner, W. S., Grady, D. G., & Newman, T. B. (2013). *Designing Clinical Research: An Epidemiologic Approach* (4th ed.). Wolters Kluwer/Lippincott Williams & Wilkins.
- Huo, J., Zhang, X., Wang, J., & Liu, L. (2019). Using Google Scholar to Find Medical Scientific Literature: A Comparison of 3- and 4-Keyword Searches. *Journal of Medical Internet Research*, 21(10), e13967. <https://doi.org/10.2196/13967>
- Jankowski, N. (2019). *Introduction to Scientific Research: A Step-by-Step Approach*.
- Jansson, S., Benoit, C., Casey, L., Phillips, R., & Burns, D. (2018). Building community-academic partnerships: Strategies for nurse researchers. *Journal of Transcultural Nursing*, 29(4), 372-380. <https://doi.org/10.1177/1043659617726019>
- Kaplan, D., & Maxwell, J. A. (2019). Qualitative research methods for evaluating computer information systems. In *Evaluating the Organizational Impact of Healthcare Information Systems* (pp. 161-193). Springer, Cham. https://doi.org/10.1007/978-3-319-98690-6_8
- Karunathilake, I., Shukry, W., & Wong, R. (2016). Medical students' perception of the educational environment in a medical college in Saudi Arabia. *Journal of Health and Medical Education Development*, 1(1), 1-5. <https://doi.org/10.5897/JHMED2016.0013>
- Khan, K., Kunz, R., Kleijnen, J., & Antes, G. (2018). Five steps to conducting a systematic review.
- Kulinskaya, E., Morgenthaler, S., & Staudte, R. G. (2008). *Meta-analysis: a guide to calibrating and combining statistical evidence*. John Wiley & Sons. <https://doi.org/10.1002/9780470997500>
- Kumar, R. (2019). *Research Methodology: A Step-by-Step Guide for Beginners*.
- Lefroy, J., Brosnan, C., & Creavin, S. (2017). Developing research competence in medical students through a student-led medical education journal. *Medical Teacher*, 39(7), 751-755.
- Liu, C., Tarpley, J. L., & Stone, V. E. (2017). Basic research skills for medical students: A scoping review. *Academic Medicine*, 92(9), 1345-1353.

- <https://doi.org/10.1097/ACM.0000000000001747>
- Liu, H., Tarpley, J. L., & Stone, V. E. (2017). Basic research skills for medical students: A pilot study of a research-based medical education program. *Medical Science Educator*, 27(1), 41-49.
- McCarthy, C. (n.d.). Tips for Effective Presentation Skills. *Indeed Career Guide*.
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & PRISMA Group. (2015). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *BMJ*, 350, g7647. <https://doi.org/10.1136/bmj.g7647>
- Nalliah, R. P., Barnes, E. H., Hughes, C. S., & Lee, L. (2019). Implementation of a comprehensive research education and training program for medical students. *Medical Teacher*, 41(6), 685-689. <https://doi.org/10.1080/0142159X.2018.1509611>
- National Cancer Institute. (n.d.). Developing a Scientific Presentation.
- Neuman, W. L. (2014). *Social Research Methods*.
- Nga, D. T. H., Chau, N. H., & Tinh, T. T. (2022). Medical students' attitudes and beliefs on the roles of probability and statistics in doing scientific research, a case study in Vietnam. *International Journal of Health Sciences*, 6(S1), 334-342. <https://doi.org/10.53730/ijhs.v6nS1.4774>
- Nguyen, H., Nguyen, H., Nguyen, T., Vu, G., & Nguyen, T. (2020). A survey on research experience and research interest among medical students in Vietnam. *Advances in Medical Education and Practice*, 11, 693-701.
- <https://doi.org/10.2147/AMEP.S259557>
- Nguyen, T. H., Nguyen, T. H., Tran, T. H. H., & Nguyen, T. H. P. (2020). An intervention to improve research training for medical students in Vietnam. *BMC Medical Education*, 20(1), 1-7.
- Nguyen, T. T. T., Nguyen, T. H. L., Le, Q. V., & Nguyen, T. H. (2020). Reliability: Definition, types, methods, and factors affecting reliability. *Journal of Education and Learning*, 9(4), 263-272. <https://doi.org/10.5539/jel.v9n4p263>
- Nguyen, T. T. T., Nguyen, T. T. H., Pham, T. N., Nguyen, T. T. N., & Vo, T. V. (2019). Research education and training for medical students in Vietnam: Current status and ways forward. *Journal of Educational Evaluation for Health Professions*, 16, 9. <https://doi.org/10.3352/jeehp.2019.16.9>
- Nhan, N., Tran, T., & Vuong, Q. (2019). Medical research and healthcare in Vietnam. In Q. H. Vuong (Ed.), *The Vietnamese socio-economic development: A critical literature review* (pp. 103-116). Springer. https://doi.org/10.1007/978-3-030-03061-4_7
- Nie, Y., Li, L., Duan, Y., & Chen, P. (2019). Effects of problem-based learning on the research competence of undergraduate nursing students. *Nurse Education Today*, 75, 77-81. <https://doi.org/10.1016/j.nedt.2019.01.012>
- Nordquist, R. (2021). *What Is Academic Writing? The Balance*.
- O'Connor, A. B., & Jackson, M. A. (2019). How to Find and Use Evidence to Improve Patient Care. *Journal of the American Academy of Physician*

- Assistants, 32(9), 16–22.
<https://doi.org/10.1097/01.JAA.0000575334.94098.10>
- Pham, T. N., Nguyen, T. T. H., Nguyen, T. T. N., & Vo, T. V. (2019). Research experiences and attitudes toward research among medical students in Vietnam. *Advances in Medical Education and Practice*, 10, 425-433.
<https://doi.org/10.2147/AMEP.S204909>
- Pham, T. V., Tran, T. D., & Nguyen, T. H. (2018). Peer-assisted learning in research methods: An experience in Vietnam. *Education for Health: Change in Learning & Practice*, 31(1), 53-56.
- Rheindorf, M., Tsirigotis, K., & Lohrmann, C. (2018). Ethical principles in medical research: A guide for the novice researcher. *BMC Medical Ethics*, 19(1), 70.
- Rheindorf, M., Tsirigotis, P., & Lohrmann, C. (2018). Ethical principles in medical research. *GMS Journal for Medical Education*, 35(3), Doc32.
<https://doi.org/10.3205/zma001174>
- Rienties, B., Brouwer, N., Lygo-Baker, S., & Gawronski, O. (2013). How effective is a tutor training programme in academic writing for tutors in higher education? A case study. *Innovations in Education and Teaching International*, 50(2), 125-135.
- Sargeant, J., Lockyer, J., Mann, K., & Holmboe, E. (2019). Facilitating and providing feedback in mentorship programs: A qualitative exploration of the experiences and perceptions of medical faculty members. *Medical Teacher*, 41(9), 1028-1035.
<https://doi.org/10.1080/0142159X.2019.1597281>
- Schmidt, N. A., & Meehan, K. A. (2017). Evidence-based practice for nurses: Appraisal and application of research. Jones & Bartlett Learning.
- Schmidt, N. A., & Meehan, M. (2017). *Practical statistics for nursing and health care*. Wolters Kluwer.
- Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, 2, 53-55.
- Tran, T. T. M., Nguyen, T. V., Nguyen, T. L. H., Nguyen, T. H. P., Nguyen, T. H., Nguyen, T. H., & Nguyen, T. N. (2019). Research involvement among medical students in Vietnam: A cross-sectional multicentre study. *BMJ Open*, 9(10), e030405.
- Tran, V. T., Nguyen, T. T. H., Pham, T. N., Nguyen, T. T. N., & Vo, T. V. (2019). Challenges to research competence development among medical students in Vietnam: A qualitative study. *Journal of Educational Evaluation for Health Professions*, 16, 29.
<https://doi.org/10.3352/jeehp.2019.16.29>
- Trinh, L. T. N., Dinh, H. T. H., Le, D. A., & Nguyen, T. K. (2020). Challenges in implementing research education and training in medical schools in Vietnam. *BMC Medical Education*, 20, 314.
<https://doi.org/10.1186/s12909-020-02200-8>
- Yin, R. K. (2018). *Case Study Research and Applications: Design and Methods*.
- Zier, K., Friedman, E., & Smith, L. (2016). Supportive programs increase medical student research productivity and residency choice: A cross-sectional study. *BMC Medical Education*, 16(1), 89.
<https://doi.org/10.1186/s12909-016-0628-6>