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Identifying and Explaining the Facilitating and Inhibiting Factors of Research Self-Efficacy

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ABSTRACT

Objective: Research self-efficacy can be defined as individuals' beliefs and judgments about their own abilities in the field of research. The present study aimed to identify and explain the facilitating and inhibiting factors of research self-efficacy among graduate students at Islamic Azad University in Hormozgan.

Methods: The research was conducted using a qualitative approach with an inductive coding system. To identify the factors influencing the research self-efficacy of graduate students, semi-structured interviews were conducted with experts, professors, and research deputies of universities in Hormozgan province. Purposeful sampling was used, and data saturation was reached after 20 interviews.

Results: The results showed that 24 factors, such as mastery of research fundamentals, the scientific structure of the university, and student participation in research activities, strengthen research self-efficacy. Conversely, 17 factors, including poor communication between professors, students, and industry, and neglecting students' abilities, had an inhibiting role.

Conclusions: Furthermore, effective performance of professors, elimination of traditional teaching methods, strengthening research interactions, and establishing professional connections with researchers were recognized as the most important strategies for enhancing research self-efficacy.

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Introduction

Research, as one of the main pillars of progress and sustainable development, plays a fundamental role in the scientific, industrial, and cultural advancement of countries (Zand, 2018). In this context, universities, as the central hubs of knowledge production, hold a significant position in societal development, and graduate education, especially at the master's level, provides an important platform for the formation of research activities. Students at these levels, guided by their professors, can make a meaningful contribution to knowledge production and the resolution of scientific and practical problems (Esmaeilzadeh Barzi, 2020). Despite the importance of research education at these levels, experience shows that formal education alone is not sufficient to achieve research competence. In this regard, research self-efficacy—which reflects an individual's belief in their ability to successfully conduct research—plays a decisive role in students' engagement in research activities (Ghorbani, 2021). High self-efficacy leads to perseverance, motivation, and self-confidence in conducting research, whereas its absence, even with sufficient training, results in avoidance of research or poor performance in it (Esmailzadeh Barzi, 2020). In this regard, research performance is considered one of the key indicators for measuring the effectiveness of universities. Improving the quality of this performance depends on creating an environment where components such as trust, motivation, environmental support, and research self-efficacy are properly identified and strengthened. The combination of these elements in a suitable environment can lead to the formation of practical ideas and the resolution of real societal issues, solidifying the role of universities as centers for knowledge production and scientific decision-making (Shavaran, 2011). However, studies show that the atmosphere prevailing in many academic departments is not research-oriented. Most of the professors' time is devoted to theoretical teaching, and there is neither sufficient opportunity nor motivation to integrate it with research. Meanwhile, a significant number of graduate students also lack the necessary readiness to enter the research field (Zeinabadi et al., 2016). It seems that one of the existing gaps in this area is the precise identification of the barriers and facilitators of research self-efficacy from the perspectives of the students themselves and academic experts. In the current context where the scientific development of the country requires strengthening university research, examining research self-efficacy as one of the key factors for students' success in this field holds special importance. A lack of research self-efficacy can lead to reduced scientific participation, weakness in conducting

independent research, and ultimately a decline in the quality of theses and scientific outputs. On the other hand, identifying factors within the university environment that can enhance this self-efficacy will facilitate effective planning in the higher education system. Given that a significant portion of students' research problems stem from environmental, attitudinal, and educational factors, this study aims to identify the facilitators and barriers to research self-efficacy by focusing on the perspectives of experts, professors, and research deputies at universities in Hormozgan Province. Understanding these factors can serve as a foundation for designing educational, counseling, and structural interventions to improve the quality of research at graduate levels. Therefore, the main research question is posed as follows: What are the facilitating and inhibiting factors of research self-efficacy among graduate students of the Islamic Azad University from the perspective of experts, faculty members, and research deputies of universities in Hormozgan Province? Regarding the research background on students' research self-efficacy, reference can be made to the study by Seyedi Nazarlou and colleagues (2022), which examined the relationship between educational interactions and academic satisfaction with students' research self-efficacy. The results of the study indicate that interpersonal interactions between students and faculty members, as well as the educational policies implemented in student environments, play a significant role as important factors in students' research self-efficacy. Porbarat and colleagues (2021) in another study investigated research self-efficacy and its related factors among students. The results indicated that students' research self-efficacy was at a moderate level; however, in the subscales of statistical and analytical self-efficacy and report writing, there was a need for appropriate educational interventions. Hesam and colleagues (2021) evaluated the research performance of graduate students and its relationship with research self-efficacy. The results showed that the level of research self-efficacy among graduate students was moderate, and there was a significant positive relationship between this indicator and research performance. Additionally, Ghorbani (2021) identified the components of research self-efficacy. The results showed that the components of research self-efficacy in organizations are related to individual, organizational, and supra-organizational factors. Strengthening and paying attention to each of these components will lead to the growth and enhancement of research self-efficacy in the organization. Heydari Sureshjani and Ghanbari (2020), in their study on the role of faculty performance quality in self-directed learning with the mediating effect of research self-efficacy,

concluded that the variables of faculty performance quality and students' research self-efficacy explain the variance in self-directed learning. Hosseini Tabkadehi and Salehi (2018), in another study, examined "the relationship between self-directed learning and students' self-efficacy with the mediating role of information literacy." The results showed that there is a significant positive relationship between self-directed learning, information literacy, and students' self-efficacy, and information literacy mediates the relationship between self-directed learning and students' self-efficacy. In another study, Hill et al. (2022) evaluated research self-efficacy among undergraduate students. The results indicated that undergraduates should be exposed to research in their classes and fields, and participation in research pools can foster interest and beliefs about research among them. Similarly, the study by Leventi et al. (2021) on research self-efficacy suggested that effective ways for educators to promote research self-efficacy include selecting students with investigative career interests. Howard (2021), in a study titled "Student Reflections on Gaining Understanding and Skills in Critically Assessing Research Articles—Exploring Barriers and Enablers," stated that both educational factors and broader social considerations influence the critical assessment of research experiences. Sonal (2020) examined research self-efficacy among doctoral counseling students and found that research self-efficacy is a key and foundational concept for progress in counseling education. Feng, Reinhardt, and Li (2019), in their study titled "Development and Psychometric Testing of the Research Empowerment Scale for Students," concluded that research empowerment is a promising, valid, and reliable tool for assessing students' research competence. Moreover, the findings of Sun, Zhai, and Anderman (2018) showed that students' research self-efficacy and the use of auxiliary strategies positively affect their academic success in previous learning environments and in the classroom. Furthermore, students' self-efficacy in collaborative learning positively influenced their use of auxiliary learning strategies during classroom learning. As the research background shows, although research self-efficacy has been addressed in some studies, the number of studies in this field is limited, and in the past two years, virtually no specific research has been conducted on this topic in the country. Furthermore, there is no study that specifically identifies and explains the facilitating and inhibiting factors of research self-efficacy. Therefore, this issue is pursued in the present study.

Material and Methods

In this study, a qualitative research method of inductive analysis with a data coding system was used. The researcher, as the research instrument, collected data through interviews. The research community included experts, professors, and research deputies of universities in Hormozgan province. The sampling method was purposeful. The researcher employed maximum variation sampling and the principle of saturation, which was achieved after 20 interviews. The data collection tool was in-depth interviews, and the data analysis method was inductive analysis. The interviews were semi-structured and conducted after the questions were approved by university research experts. To increase the credibility and trustworthiness of the findings, the "audit trail" method was used. Introduced by Lincoln and Guba (1985), this method emphasizes the accurate and systematic documentation of all research stages from beginning to end and is considered one of the most valid methods for validating qualitative research. The audit trail enables the researcher to present the data analysis process transparently, documented, and traceably. In the first stage, after conducting the interviews, the researchers performed initial coding of the data. In this stage, key themes and concepts were extracted and labeled from the interview texts. Then, the extracted codes were reviewed collectively to ensure their accuracy and comprehensiveness. Subsequently, to increase precision, the final codes were reviewed by several independent and expert analysts in the field. Cohen’s kappa coefficient was calculated to measure inter-rater agreement, which was above 0.98; this value indicates very high alignment and appropriate coding validity. Next, to ensure the content validity of the codes, the final findings and categorizations were presented to five experts and professors in the research field, and their feedback was incorporated. Additionally, "member checking" was used; that is, the results were returned to some participants to confirm the accuracy of interpretations and analyses from their perspective. This approach is considered one of the key methods for increasing the validity of findings, especially in qualitative research.

Results

In response to the question regarding the most important facilitating factors of research self-efficacy among graduate students at Islamic Azad University, the analysis conducted on the interview transcripts resulted in the following table after three stages of coding. Each of the columns below corresponds to one stage of the coding process:

Table 1. Research Findings

Initial Code	Key Points (Open Codes)	Main Concepts (Axial Codes)	Key Categories (Selective Codes)
M1N1	Mastery of specialized research literature	Mastery of research literature	Mastery of research literature and fundamentals
M1N2	Proper structural design for enhancing research skills	Existence of an appropriate research structure at the university for developing students' research dimension	Scientific and research structuring of the university
M2N4, M6N11, M11N5&6, M12N7	• Introducing appropriate resources and reference books to students • Equipping and highlighting the role of the library in the university research process • Creating skills and familiarizing students with global databases and information sources	Existence of suitable informational and library resources and familiarizing students with them	
M3N10, M5N2, M6N10&12, M12N1, M14N1&5, M15N5, M20N8	• Providing fields and helpful links to students. • Preparing a suitable research environment for students by the university. • Provision of sufficient research resources and facilities in universities. • Equipping and strengthening data servers for accessing reputable research sites. • Availability of research resources and facilities. • Availability of facilities, equipment, libraries, and IT resources. • Access to libraries, databases, necessary equipment, and software.	Creating suitable research infrastructure for students and professors	
M2N1, M6N7, M14N2, M16N3, M18N3, M20N4&6	• Effective teaching and guidance by experienced professors in research methods. • Proper educational process, especially in research methods. • Leadership and guidance by professors and advisors. • Offering research methods courses more seriously, practically, and applicably for students. • Support from supervisors and advisors. • Conducting the research process entirely by the student with the support of the supervisor.	Proper performance of research course professors at the university	Practical and high-level research performance of research course professors

M2N2, M6N1, M7N2, M10N2, M11N1	• Use of case studies and practical examples in teaching research methods. • Shifting students' attention from pure theory to the application of science and knowledge by professors. • Effective teaching methods in research-related courses.	Practical and effective teaching in university research courses	
M2N5, M4N6, M6N8, M7N8, M11N8, M16N2, M19N2	• Selection of experienced professors for research methods courses in universities. • Using skilled and expert professors in research methods. • Employing knowledgeable, researcher, and capable professors in universities. • Supervisor's mastery of research processes. • Employing quality professors in the research field. • Using proficient professors in research methods courses.	Employing experienced and efficient professors in research courses	
M4N7, M6N9, M8N9, M10N7, M11N13, M12N6, M13N2, M15N12, M17N2, M20N2&3&7	• Supervisor's availability and sufficient time for students. • Availability of professors. • Close monitoring of preliminary projects by the supervisor. • Step-by-step evaluation of the student's research work by an experienced professor. • Supervisor's monitoring of research methods and data collection. • Evaluation and feedback from professors to students. • Supervisor's support. • Monitoring the research process and providing constructive feedback. • Using professors who have enough time and appropriate ethics and behavior with students. • Evaluation of the research process by the student.	Supervision and sufficient time spent by professors for students in research activities	
M7N5	• Properly guiding students towards their practical abilities and research interests by professors.	Proper guidance of students in the research process by professors	
M2N3, M12N4, M14N6	• Effective guidance of students in using research resources and information and connecting with reputable research and industrial networks.	Connecting students with reputable research networks and centers	Involving graduate students in research events, exhibitions, networks, and reputable scientific research centers

	• Opportunities for collaboration and networking. • Networking opportunities.		
M3N8, M4N4, M7N3&9, M12N8, M14N3, M18N15	• Introducing relevant research events to students. • Placing students in real research environments. • Close contact between students and laboratory or field operations. • Participation in conferences and seminars.	Introducing and involving students in major national and international research events	
M3N9, M11N14, M18N2	• Organizing research exhibitions and startups. • Raising the university's scientific and research profile in national and international forums.	Organizing reputable and efficient research exhibitions and startups	
M3N1, M6N2, M7N4, M15N2, M19N5	• Appropriate behavior of professors with graduate students. • Professors accompanying students in entering the research field. • Supervisor's good understanding of the student's talents. • Guidance and encouragement from professors.	Establishing proper communication between professors and students in research courses	Creating and strengthening professional relationships between professors and students in research
M3N4, M6N6, M13N6, M15N14, M17N1	• Student's purposeful approach to research work. • Using students as research assistants in universities. • Providing research assistant opportunities for students. • Employment as a research assistant.	Using students as research assistants by professors	
M3N2, M5N1, M9N3	• Supervisor's concern for educating students who can solve the country's problems and build the next generation. • Supervisor's support.	Professors' concern in research for training efficient personnel to solve national issues	Forming a positive attitude among professors and students towards research efficiency
M3N4	• Student's purposeful approach to research work.	Personal goal-setting by students regarding effective research	
M3N5, M6N5, M9N5, M12N2&5, M13N5, M15N6, M17N6	• University support for research. • Comprehensive support for theses and research works. • University and research team support for students.	University support for researchers, especially student researchers	Comprehensive support from university, society, and industry for professors and student researchers

	• Support from professors and mentors. • Financial support and scholarships. • University support. • Providing scholarships, grants, and financial facilities for research.		
M6N14, M8N3, M9N1	• Creating necessary mechanisms for optimal use of research results by students and professors in real society. • Ensuring a research career future.	Creating grounds for utilizing university research results in practical society to solve real problems	
M15N10	Society's appreciation of science and research	Society's appreciation and valuing of research	
M17N5	Support from industries and different organizations for student research activities	Support from external organizations for university research	
M3N6, M11N11&15, M15N4&13, M17N4, M18N1&4&5	• Removing obstacles to encouraging publication of articles. • Creating research opportunities for students to experience success. • Selecting the best research work to create motivation. • Encouraging research activities. • Awarding prizes and certificates to top researchers. • University encouragement of students active in research. • Research incentives. • Encouraging and introducing student researchers in scientific and student events.	Adopting appropriate incentive mechanisms for researchers	Allocating motivational and incentive packages for professors and student researchers
M3N7, M4N3, M6N3, M8N8, M10N3	• Motivating professors and students. • Creating motivation in students. • Financial benefits in projects and research for students and professors. • Creating proper motivation for conducting research and achieving desirable results.	Motivation creation in professors and students towards effective research	
M4N1, M6N4, M9N2, M14N4, M15N9	• Using the experiences and successes of other graduate students as models.	Introducing and employing successful students in research as	Creating and strengthening professional relationships between students and other

	• Talking with capable people in research. • Providing successful models to students. • Collaboration with successful professors.	models and research partners	successful researchers as models and research partners
M4N2	Creating an alumni club and holding meetings with successful graduates	Creating an alumni club for successful graduates in research	
M4N5, M10N6, M13N4, M14N8, M18N10&11	• Conducting team research work in the university environment. • Students conducting joint research work. • Collaboration and teamwork with other students. • Collaboration with university colleagues and students in joint research projects. • Student brainstorming groups.	Promoting the culture of group and team research in the university	
M4M8	Supervisor's availability and sufficient time	Eliminating assignment-based approaches in teaching research processes	Eliminating traditional approaches and strengthening interactive approaches in teaching research processes
M7N7, M8N7, M9N7, M10N1, M16N1, M19N1	• Conducting small practical or library projects at the undergraduate level. • Conducting preliminary research and gaining precise management. • Conducting precise field research by students under the supervision of professors and the university. • Conducting field research. • Assigning performance tasks requiring limited research reports on a topic.	Using project-based methods in teaching research processes	
M8N6, M9N6, M10N4, M11N3, M18N8, M20N5	• Step-by-step research learning. • Conducting research step by step under the supervision of professors. • Step-by-step guidance of students in conducting research. • Assigning practical and incremental tasks to students. • Step-by-step teaching of research methods to students.	Process-based and step-by-step teaching of research work	

M11N18&19, M18N16	• Problem identification and problem-finding. • Identifying real problems and suggesting them to students for research.	Identifying and introducing fundamental issues to students for research	
M6N13	Simplifying and shortening the administrative cycle of information gathering in the research process.	Simplifying the administrative cycle in the research process, especially data collection	Facilitating administrative processes in research
M6N15, M10N5, M11N2, M13N3, M15N11, M16N4, M18N7, M19N4, M20N1	• Holding workshops and specialized seminars in research. • Student participation in skill training courses. • Teaching new research methods. • Educational programs, workshops, and courses. • Existence of courses and workshops related to research methodology. • Holding mandatory workshops on thesis writing.	Holding appropriate research workshops for students regarding research	Holding appropriate seminars and workshops for students
M6N16, M7N6, M11N16	• Increasing students' proficiency in English. • Student proficiency in reading scientific and research texts in both Persian and especially English.	Increasing students' ability in English and using foreign sources	Strengthening foreign language skills in graduate students
M7N1, M8N5, M13N1, M15N1	• Students' scientific literacy from previous education. • Proper training of specialized prerequisites. • Previous research experience.	Students' prior experience and knowledge from previous levels regarding the research process	Previous training and strong cognitive structure of graduate students regarding the research process
M8N1	High academic aptitude and research intelligence of the student.	Personal and internal talents in conducting research	Existence of internal capacities and abilities in conducting research
M8N2, M11N17, M12N3, M17N3	• Competitive academic and educational environment. • Creating a competitive environment among universities for research. • Motivational and competitive scientific and cultural environment at the university.	Competitive academic environment in conducting research activities	Creating a desirable competitive atmosphere in research at the university level
M8N4, M15N7	• Creating effective communication between mid-level and top-level universities.	Proper communication between universities in research	Creating and strengthening professional research relationships between universities, especially successful ones

	• Interaction with researchers and experts from other universities and scientific centers.		
M9N4	Growth in establishing proper human and social relationships in students.	Developing methods for establishing appropriate communication in students' research work	Developing prerequisite research skills in graduate students
M11N9	Creating and strengthening self-learning skills in students.	Developing students' basic skills in research work	
M11N4	Raising the university's scientific and research profile in national and international forums.	Promoting the university's research level in national and international forums	Promoting the university's scientific and research level in international forums
M11N7, M15N15, M18N9, M19N3	• Flourishing and supporting scientific research associations in the university. • Membership in scientific associations. • Student scientific associations.	Developing and supporting scientific research associations in the university	Forming and developing scientific research associations at the university level
M15N3	Existence of a suitable environment for discussion and scientific critique.	Providing a platform for discussion and scientific critique	
M11N10	Assigning research work to students who are capable of doing it.	Considering students' abilities when assigning research work	Paying attention to students' capabilities and internal capacities regarding research work
M11N11	Creating research opportunities for students to experience success.	Creating opportunities for students to conduct easy research and feel successful	
M13N7, M14N7	• Providing platforms for students to publish their research findings. • Providing a platform for students to publish their research findings by the university.	Providing platforms for publishing research findings for students by the university	Creating suitable platforms for publishing research works
M15N8	Family and friends' support.	Support from close ones for conducting research	Family and close support for graduate students
M18N12	Holding public defense sessions (for students of the field).	Holding public and mandatory thesis defense sessions	Holding public and mandatory thesis defense sessions for graduate students

In response to the second question, regarding which factors are the most significant barriers to research self-efficacy among graduate students at Islamic Azad University, the following table was

obtained after three stages of coding, based on the analysis of interview transcripts. Each of the columns below corresponds to one stage of the coding process:

Table 2. Findings of the Question

Initial Code	Key Points (Open Codes)	Main Concepts (Axial Codes)	Core Categories (Selective Codes)
M1N1	Lack of a specific structure for empowering students in research.	Lack of a defined academic structure for research self-efficacy among students.	Weak academic structure for student development and research self-efficacy among graduate students.
M1N2	Absence of appropriate structure and opportunities in the student development process in the country.	Lack of a defined academic structure for student development.	
M15N3	- Weakness in university curricula in research. - Repetitive research courses at university levels.	Weakness in university curricula in research.	
M15N4	- Lack of accessible research resources. - Insufficient research resources and facilities at universities. - Lack of suitable laboratories for research work. - Lack of powerful computational facilities such as supercomputers. - Lack of access to data and information databases. - Limited resources and facilities.	Lack of accessible print and electronic resources for researchers.	Weak physical, financial, and administrative university structure for the growth of research self-efficacy among graduate students.
M15N6	Lack of proper research funding for graduate projects, resulting in projects not being steered toward standard research with tangible outcomes.	Inadequate allocation of research funding for research projects.	
M12N5	Lack of access to scientific and research networks.	Lack of access to scientific and research networks for students.	
M12N6	Administrative and bureaucratic problems.	Administrative and bureaucratic issues in the research process.	
M2N2	Time constraints for students to conduct research.	Time constraints for employed students.	Personal limitations and issues of students and professors in conducting research.
M14N2	- Physiological and psychological problems of students. - Inability of students to manage stress.	Personal issues affecting students' research process.	
M5N3	Financial and economic pressures for both professors and students.	Economic issues affecting professors and students.	
M19N2	- Very little time for students themselves. - Lack of time due to employment.	Lack of sufficient time allocated by students for research work.	
M2N3	Lack of students' familiarity and adaptation with the university research system.	Lack of students' familiarity with the university research system.	Lack of a clear educational program to familiarize students with the university's research structure and system.
M6N4	Lack of student awareness of the practical aspects of their field and courses studied.	Insufficient familiarity of students with academic and research fields.	
M8N10	- Lack of proper understanding of the process of conducting a standard research project. - Research is not taught adequately at any academic level.	Lack of proper understanding of the research process among students.	
M7N4	Lack of student understanding of research achievements and their important role in scientific progress.	Lack of proper understanding of research achievements in societal advancement.	

M8N7	- Instability of motivation. - Lack of motivation-building for students by the university and society. - Absence of motivational aspects for professors and students. - Inadequate motivation for graduate students.	Burnout and motivational instability among researchers during research work.	Psychological and motivational weakening of graduate students during the research process.
M9N2	Negative self-belief of students that they are not capable of conducting research.	Negative self-efficacy.	
M19N1	Misconception of students about the master's level and comparing it with the undergraduate level.	Lack of proper understanding of the nature of graduate studies among students.	
M2N5	Confusion of students due to the variety of research issues in their field.	Unavailability of required research topics and fields for students.	Lack of access to a compiled set of research issues and fields needed by society and industry for graduate students.
M18N1	Degree orientation.	Degree orientation.	Degree orientation.
M10N7	- Professors not allocating enough time due to workload and lack of financial incentive. - Professors and especially students not allocating enough time for research.	Insufficient time and energy allocation by research professors.	Weak performance of research professors.
M10N4	- Student abandonment during research. - Weakness in the academic evaluation system at universities.	Lack of proper and practical supervision of students during the research process.	
M8N1	- Professors' lack of mastery of the subject and research methods. - The prevailing culture in academia does not have a research-oriented approach as it should.	Lack of employment of competent and experienced professors in research.	
M10N6	- Lack of proper guidance for students by professors. - Lack of supervisor support. - Weak accompaniment of professors during student research. - Lack of guidance and confidence-building by professors.	Poor performance of professors in guiding students in research.	
M12N3	- Some professors' lack of commitment to standard research practices or lack of mastery, leads to poor role modeling or student discouragement. - Professors' lack of seriousness due to inadequate university facilities.	Lack of necessary commitment by professors towards teaching and conducting research.	
M20N3	- Professors' condescending attitude towards students and lack of a friendly atmosphere. - Limited interaction between professors and students at the Islamic Azad University.	Lack of a proper relationship between professors and students.	Lack of desirable relationships among professors, students, the university, society, and industry in research.
M15N5	- Lack of proper connection between students, professors, and industry/society. - Lack of proper connection between academia and executive/industrial environments, leading to insufficient motivation for effective research. - Gap between societal issues and university research topics.	Lack of proper connection between students, professors, and research with society and industry.	
M3N5	Unrealistic expectations of professors from students.	Unrealistic and excessive expectations from students by professors.	Lack of attention to the capacity and ability of graduate students in assigning research tasks.
M11N3	- Non-applicability of theses. - Lack of financial benefit for students in projects and research. - Lack of use of university research results by policy-making bodies.	Lack of acceptance of university research by society.	Lack of sufficient support for student and professor researchers by society and industry.
M13N2	- The supervisor and advisor's disregard for the need to train researchers for the country. - Lack of proper funding for practical training and student research projects, especially at the undergraduate level. - Lack of financial	Weak support and a lack of attention from university and executive factors in nurturing	

	support for laboratory and research work. - The university not providing research opportunities for students in line with proper research methods education. - Financial limitations.	capable researchers for society.	
M9N7	- Weak position of research in society. - Society does not value a research culture.	Lack of proper value for research in society.	
M17N2	Uncertain job prospects.	Lack of profitability of research for students and professors.	
M8N8	- Lack of alignment between students' interests and their field of study. - Lack of student interest in their field.	Lack of student interest in research topics and fields.	Weak attitude and motivation of graduate students toward research work.
M10N1	False self-confidence regarding the ability to conduct research.	False self-confidence in research ability.	
M16N2	- Lack of basic research knowledge and skills among graduate students. - Lack of necessary expertise, especially from previous education. - Admission of academically weak students.	Lack of basic research knowledge and skills among graduate students.	Lack of initial research competencies among graduate students.
M16N3	Weakness in the English language.	Weaknesses of students in foreign languages.	
M18N3	Lack of attention by executive bodies to research activities, focusing on degrees and practical experience in employment.	Lack of attention to research skills and abilities in student selection processes.	
M18N4	Entry from non-specialized fields into graduate studies.	Lack of alignment between graduate fields and previous education.	
M15N1	- Lack of attention to software and workshop aspects during students' education. - Lack of research methods courses. - Lack of specialized workshops.	Lack of research methods and software training courses during students' education.	Lack of appropriate research methods courses for graduate students.
M20N1	- Only theoretical teaching in specialized and core courses. - Insufficient practical and laboratory activities in basic courses. - Insufficient practical and field activities in graduate studies. - Repetitive theoretical teaching of research methods.	Only theoretical teaching of research methods.	Use of traditional teaching methods and lack of modern methods.
M6N8	Replacement of connections over merit in accepting students' research works.	Connections replacing merit in the acceptance of research articles.	Unfair acceptance and a relational approach to research work by academic and authoritative centers.
M15N7	- The prevailing culture in academia is not sufficiently research-oriented. - Lack of research spirit at the university. - Non-research environment at the university.	Lack of dominant research culture in academia.	Existence of grounds for research fraud in society.
M9N6	Existence and free activity of data-generating bases and individuals outside the university.	Unregulated activity of independent research centers outside the university.	
M10N2	Existence of grounds for research fraud.	Existence of grounds for research fraud in research work.	

To ensure the reliability and validity of the findings and results of this study, the inter-rater agreement coefficient for the analysis units assigned to the components was determined by consulting five experts. The components listed in the above table were presented to the experts, and their opinions regarding each category were collected and taken into account. To achieve this,

a dichotomous questionnaire based on agreement or disagreement with the components derived in this research was designed and distributed among five specialists in the field of research and methodology. Additionally, the questionnaire included an open-ended column next to each component for providing corrective and suggestive feedback. The results of the questionnaires indicated a maximum agreement rate of 98% among the experts with the components identified by the researchers. Moreover, their suggestions and corrective comments were incorporated to refine and strengthen the research components.

Discussion

In the present study, we sought to answer two main research questions regarding the issue of research self-efficacy. Regarding the first research question, the results indicated that there are 24 key components, including mastery of the literature and fundamentals of research, a structured academic research environment at the university, effective and high-level research performance by research course professors, involving graduate students in research events, exhibitions, and reputable scientific-research networks and centers, establishing and strengthening professional relationships between professors and students in research, forming positive attitudes among professors and students towards enhancing research activities, comprehensive support from the university, society, and industry for research professors and students, providing motivational and incentive packages for research professors and students, creating and strengthening professional relationships between students and other successful researchers as role models and research collaborators, eliminating traditional approaches and strengthening interactive approaches in teaching research processes, facilitating administrative processes in research, holding suitable seminars and workshops for students, improving foreign language skills among graduate students, prior training and a strong cognitive foundation for graduate students regarding the research process, the existence of internal capacities and abilities for conducting research, creating a favorable competitive environment for research at the university level, establishing and strengthening professional research relationships between universities, especially successful ones, developing prerequisite skills for research work in graduate students, enhancing the university's research standing in international forums, forming and expanding scientific-research associations at the university, paying attention to students' internal abilities and capacities for research work,

creating suitable platforms for publishing research outputs, support from family and relatives for graduate students, and holding public and mandatory thesis defense sessions for graduate students. These are considered facilitators of research self-efficacy. Among these, four components effective and high-level research performance by research course professors, eliminating traditional approaches and strengthening interactive approaches in teaching research processes, and creating and strengthening professional relationships between students and other successful researchers as role models and research collaborators stand out the most, while the other components are of secondary importance.

In explaining the findings of the first question, it should be noted that mastery of research literature in all sections, from philosophical and theoretical foundations to topic selection and interpretation of results, should be emphasized in the training of graduate students. A suitable research structure should be established at universities for developing the research dimension of students. Appropriate informational and library resources should be made available and students should be familiarized with them. Adequate research infrastructure for students and professors should be created, and the performance of research course professors should be strengthened and highlighted. Practical and effective teaching in university research courses should be prioritized. Experienced and competent professors should be employed for research courses. Professors should provide sufficient supervision and dedicate enough time to students for research activities. Professors should guide students appropriately through the research process. Students should be linked to reputable research networks and centers and participate in important national and international research events. Credible and effective research exhibitions and start-ups should be held. Proper relationships should be established between professors and students in research courses, and students should be used as research assistants by professors. Professors' concern for developing efficient human resources to solve the country's problems should be increased, and students should set personal goals for conducting effective research. The university should support researchers, especially student researchers, and facilitate the use of university research results in the real world to solve actual problems. Society should place greater value on research. External organizations should support university research and adopt appropriate incentive mechanisms for researchers. Motivation should be fostered among professors and students for conducting effective research. Successful students in research should be introduced and employed as role models and research

collaborators. An alumni club for successful researchers should be established and the culture of group and team research should be promoted at the university. The task-based approach in teaching research processes should be replaced with a project-based approach. Step-by-step and process-oriented research training should be implemented, and fundamental issues should be identified and introduced to students for research work. The administrative cycle in the research process, especially data collection, should be facilitated, and suitable research workshops should be held for students. Students' English language skills and use of English resources should be enhanced through comprehensive language programs provided by the university, and students' previous experience and knowledge of the research process should be updated. The academic environment for research should become more competitive, and proper relationships should be established between universities in the field of research. Methods for establishing appropriate student communication and their basic skills for research work should be redeveloped. Fundamental steps should be taken to promote the university's research standing in national and international forums, and scientific-research associations should be expanded at the university. Platforms for scientific discussion and critique should be established, and opportunities should be created for students to experience success in research. The university should provide platforms for students to publish their research findings, and finally, thesis defense sessions should be held publicly and mandatorily.

Regarding the second research question, the results showed that there are 17 key components, including a weak academic structure for student development and research self-efficacy, weak physical, financial, and administrative university structure for the growth of research self-efficacy, personal limitations and issues of students and professors in conducting research, lack of a clear educational program to familiarize students with the university's research structure and system, psychological and motivational weakening of graduate students during the research process, lack of access to a compiled set of research issues and fields needed by society and industry for graduate students, degree orientation, weak performance of research professors, lack of desirable relationships among professors, students, university, society, and industry in research, lack of attention to the capacity and ability of graduate students in assigning research tasks, lack of sufficient support for student and professor researchers by society and industry, weak attitude and motivation of graduate students toward research work, lack of initial research competencies among

graduate students, lack of appropriate research methods courses for graduate students, use of traditional teaching methods and lack of modern methods, unfair acceptance and relational approach to research works by academic and authoritative centers, and existence of grounds for research fraud in society. Among these, four components weak academic structure for student development and research self-efficacy among graduate students, weak physical, financial, and administrative university structure for the growth of research self-efficacy among graduate students, personal limitations and issues of students and professors in conducting research, and weak performance of research professors stand out the most, while the other components are of secondary importance.

In explaining the findings of the second question, it should be noted that there is practically no specific academic structure for student development and research self-efficacy for graduate students. There are weaknesses in the university curriculum in the field of research, such as limited access to print and electronic resources for researchers. Sufficient and appropriate research funding is not allocated for research projects. Access to scientific and research networks for students is difficult, and administrative and bureaucratic issues are frequently encountered in the research process. Students do not dedicate enough time to research due to problems such as employment and economic issues. Students are not familiar with the university research system, academic and research fields, and do not have a proper understanding of the research process, the nature of graduate studies, or the role of research achievements in societal progress. The required research topics and fields are not provided for students. Degree orientation has replaced the scientific approach, and sufficient time, energy, and proper, practical supervision are not provided by research professors. Competent, committed, and experienced professors are not employed in the field of research, and professors do not perform adequately in guiding students in research. Proper relationships between students and professors in research with society and industry are not observed. Professors often have unrealistic expectations that exceed students' capacities. Society does not welcome university research, and even the university and executive agents do not perform adequately in developing capable researchers for society. Research is not valued appropriately in society, and research does not bring significant benefits for students and professors. Usually, graduate students lack basic research knowledge and skills and are weak in foreign languages. Research abilities and skills are not sufficiently considered in student selection processes, nor is

the alignment of graduate fields with students' previous education. Courses introducing research methods and the use of research software are not held as they should be during students' studies. Practical training is limited, and theoretical methods dominate classrooms. Connections, rather than merit, are seen in the acceptance of research articles, and the research culture does not dominate the academic environment of the country. Independent research centers outside the university act autonomously and create grounds for research fraud.

Overall, the findings of this study are consistent with the results of studies by Seydi Nazarloo et al. (2022), Pourbarat et al. (2021), Hessam et al. (2021), Ghorbani (2021), Heydari Sureshjani & Ghanbari (2020), Hoseini Tabaghdehi & Salehi (2018), Hill et al. (2022), Liventi et al. (2021), Hoorad (2021), Sonal (2020), and Feng, Reinhardt & Li (2019), and do not conflict with other research conducted in the field of literacy, being in line with them.

Based on the results of this research, it is recommended that a specific academic structure for student development and research self-efficacy among graduate students be defined and implemented. The availability of print and electronic resources for researchers should be increased. Sufficient and appropriate research funding should be allocated for research projects. Access to scientific and research networks for students should be facilitated, and administrative and bureaucratic problems in the research process should be reduced. The required research topics and fields for students should be provided and made accessible. Sufficient time, energy, and proper, practical supervision should be allocated by research professors to students. Competent, committed, and experienced professors should be employed in the field of research. Society should welcome university research and the value of research in society should be strengthened. Courses introducing research methods and the use of research software should be held during students' studies. Practical training in research courses should be enhanced and the research culture should become dominant in the academic environment of the country.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by the ethics committee of the Islamic Azad University of Hormozgan Province. The patients/participants provided their written informed consent to participate in this study.

Author contributions

A. E., K. N., M. Z., and M. S. contributed to the study conception and design, material preparation, data collection, and analysis. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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