Needs and Barriers of Early Career Researchers at Regional Universities of Kazakhstan

Gulzhana Kuzembayeva[1], Bauyrzhan Tashmukhambetov[2] & Zhumagul Maydangalieva[3*]

Abstract

This paper aims to investigate early career researchers' (ECR) needs and barriers in conducting research at Kazakhstani regional universities employing a mixed methods research design with the collection of both quantitative and qualitative data. We surveyed one hundred and twenty university academic staff undertaking the first stages of their research careers at the higher education institutions of West Kazakhstan in the cities of Aktau, Aktobe, Atyrau, and Oral to understand the needs and challenges faced by this community better. Semi-structured interviews were conducted with the research administration of the above-stated institutions to understand the issues under study. Understanding these issues is central to developing informed policies for promoting teacher research engagement, as well as taking steps to build the research capacity of university academic staff in their early research career. The study depicts that the university academic staff, in their early research career, face barriers such as the lack of time to conduct research, the difficulty in publishing research, and the lack of research mentorship and university support. The study resulted in the relation of ECRs' knowledge of languages to their research experience, and the ECRs' research directions are as well associated with their (1) conducting research for enhancing teaching skills, (2) applying for research grants, and (3) receiving research funding adds to a deeper understanding of the ECRs' research needs and barriers. Kazakhstani regional universities' ECRs need specifically targeted policies to be undertaken to facilitate their research careers.

Keywords: *Early career researchers, higher education and science, Kazakhstan, regional universities, research engagement, needs and barriers in doing research.*

Introduction

Various barriers complicating building a research career in higher education institutions cause difficulties attracting academic staff, especially young specialists (Efimova, 2021). All early career researchers (ECRs) face challenges and opportunities to enhance their research – often simultaneously (Fenton et al., 2016). The forecast of the nation's scientific potential in Kazakhstan confirms it reflects the loss of the most active young specialists with a higher potential for creative

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[1] *Ph.D. in Philology, Associate Professor, K. Zhubanov Aktobe Regional University, kuzembayeva@mail.ru*

[2] *Rector, Ph.D., Baishev University, tashnukhambetov@gmail.com*

[3] *Ph.D. in Education, Associate Professor, Baishev University, maydangalieva@mail.ru*

activity in research and the aging of the university research staff (National Science Report, 2020, pp.167-168).

Faculty members play a crucial role in higher education institutions (Marsh & Hattie, 2002; Olo et al., 2021), and faculty scholarly projects enhance the research culture in a given institution (Bai et al., 2012). To enhance the research culture at higher education institutions and foster the research capacity of ECRs, it is essential to bring their needs and challenges in conducting research to light. A few studies have examined the ECRs' engagement in research, their reasons for conducting research, and the challenges they encounter in their research careers. Moreover, no research addressing these issues in the regional context was found in Kazakhstani higher education.

Problem

A stable decrease exists in the number of young scientists in the Republic of Kazakhstan and the need for building their research capacity, especially relevant to the regional higher education institutions. Therefore, the ECRs' research engagement, needs, and barriers in conducting research should be closely studied in Kazakhstani regional universities.

Objective

The objective of this study is to understand the perspectives of the university teachers at the beginning of their research career and the university administration responsible for research at the regional universities in the cities of Aktau, Aktobe, Atyrau, and Oral of the Republic of Kazakhstan on the ECRs' research engagement specifics and the factors limiting the ECRs' engagement in research.

Research Questions

The present research aims to explore the following research questions:

RQ 1. What are the research attitudes (research engagement frequency and reasons for doing research) of the academic staff undertaking the first stages of their research careers at the Kazakhstani regional universities?

RQ 2. What are the ECRs' barriers to their engagement in research?

RQ 3. To what extent are the ECRs' language skills, research engagement frequency, and barriers to conducting research interrelated?

RQ 4. Is there a significant relationship between the research directions and research attitudes of ECRs?

The research relevance lies in the in-depth understanding of the ECRs' research engagement, their needs, and barriers impeding them from conducting the research might contribute to promoting their engagement in research, enhancement of teaching and learning processes, and institutional improvement (Jamoom & Al-Omrani, 2021).

Figure 1 presents the conceptual model with control, mediating, and moderating variables of the study.
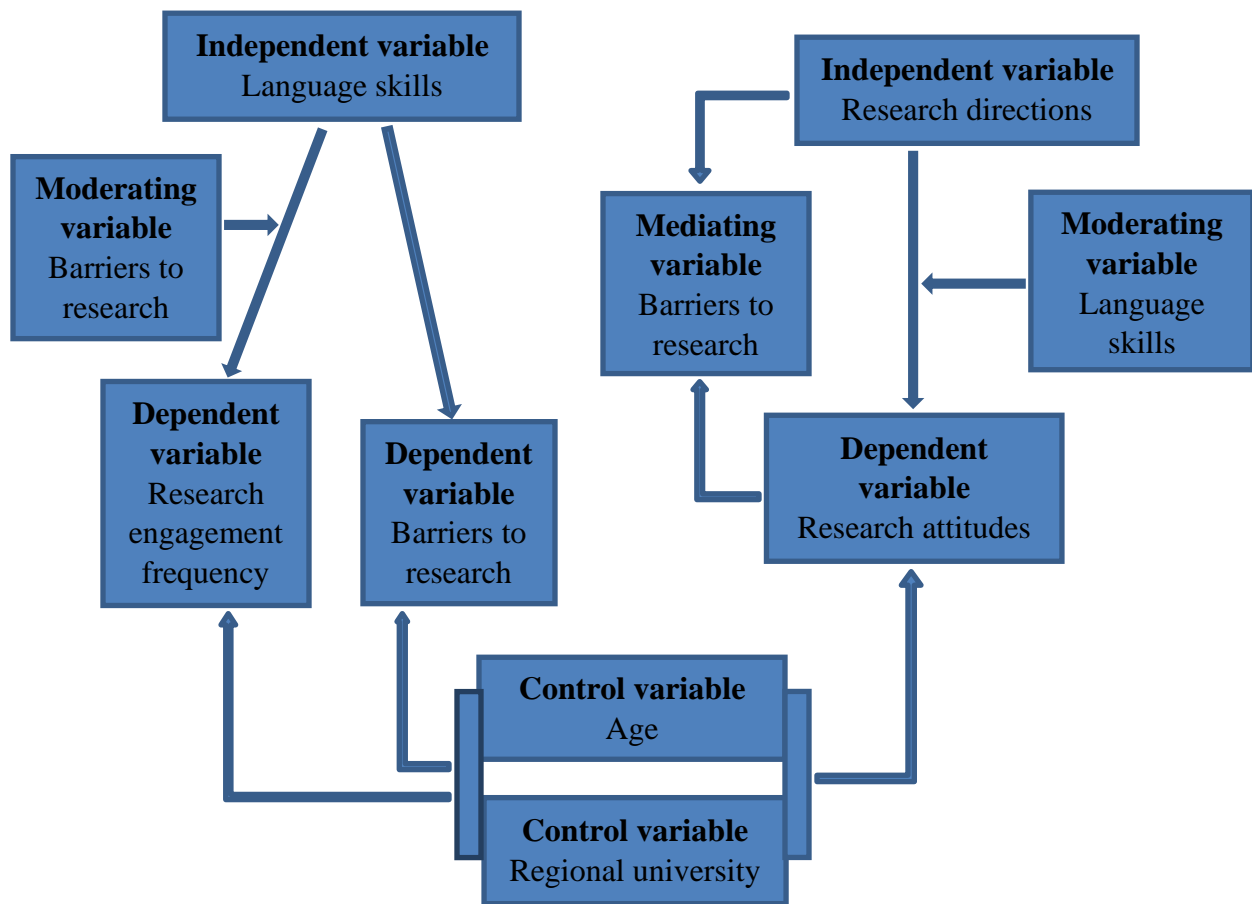

Figure 1. Conceptual Model with Control, Mediating, and Moderating Variables

Literature review

Understanding their theoretical relationships is vital in any study with different variables. Thus, it is relevant to define ECRs' research engagement and barriers to conducting a study in Kazakhstani regional universities.

The Inventory of academic titles, categories, and positions facilitating careers in higher education defines Early Career Researcher also known as Early Stage Researcher (ESR). "ECR is someone who is within eight years of the award of the Ph.D. and/or within six years of their first academic appointment – the first full or part-time paid employment contract that lists research or teaching as the primary function" (Academic Pathways Across Countries). The UK Research and Innovation also presents the same definition for the ECR (Early career researchers: career and skills development, 2022).

The definition stated by the Model Law "On State Youth Policy" (dated November 23, 2012, No. 38-10, adopted by the Inter-Parliamentary Assembly of the CIS countries) is slightly different from that given by the Inventory of academic titles, categories, and positions facilitating careers in the higher education sector. It defines the term "young scientist" as "an employee of an educational or scientific institution until he/she reaches the following age: Doctor of Science – 40 years old, Candidate of Sciences – 35 years old, Specialist without a degree, Graduate Student – 30 years old (Youth and Science, 2019). However, 44 years of age was set as the upper limit for youth during the opening ceremony of the Year of Youth in Kazakhstan.

Nevertheless, being too rigid on these definitions fails to encapsulate diverse research and academic community at the universities of the Republic of Kazakhstan. Many academics at Kazakhstani universities are at the level of senior lecturers holding a Master's degree and undertaking the first stages of their research careers. We consider the most relevant definition of the ECR stated by the documentation for participating in the grant projects under the Ministry of Science and Higher Education of the Republic of Kazakhstan and regulations for inclusion into the University Board of Young Scientists. According to them, the ECR is an academic staff of the higher education institution holding a Master's degree under 40 years of age.

ECRs constitute a large portion of the academic workforce, and their experiences often reflect the broader culture of the research system (Christian et al., 2021). In Kazakhstan, the quality training of ECRs within the framework of doctoral programs is mainly concentrated in the top universities of the country's largest cities. This mechanism is insufficiently effective because the statistics

given in the National Science Report (2020, p. 168) demonstrate the decrease in the number of young scientists: "In recent years, the influx of young people into science has decreased from 11 to 7% of the total number of academic staff engaged in R&D, and the problem of aging of research staff is still relevant." It is especially relevant in regional higher education institutions.

Attention to research is one of the most crucial issues in scientific communities (Bahadori et al., 2015). Given that research engagement has traditionally been essential for tenure-track faculty to continue in the academy (Boyer & Cockriel, 1997), staff in institutions primarily focusing on teaching and professional training are actively encouraged to conduct research (Bazeley, 2003; Cronan & Deckard, 2012; Tarman & Chigisheva, 2017). Changes in the higher education system caused a massive increase in the number of academic staff engaged in research and increased pressure to obtain central or external project funding and significant research results (Baro et al., 2017; Chval & Nossaman, 2014; Gitlin & Lyons, 2004; Yaun et al., 2020; Strielkowski & Chigisheva, 2018a; Strielkowski & Chigisheva, 2018b; Strielkowski & Chigisheva, 2019). Thus, in the highly competitive research environment, ECRs face challenges competing with those with long-established credentials (Bazeley, 2003).

The university teachers' barriers to regularly engaging in research include the low priority of research in tertiary institutions and poor funding of the education sector (Baro et al., 2017). Moreover, they comprise the impossibility of balancing teaching and research because of an overload of faculty (O'Connor et al., 2011), lack of academic writing skills (Walden & Bryan, 2010), and difficulty for ECRs to establish themselves. Furthermore, having been recognized by peer-reviewed journals, longwinded and depressing submissions of papers (Conference highlights, 2022), work-life imbalance, insufficient research funds, or job instability are other relevant issues (Ranieri et al., 2016).

Okoduwa et al. (2018) state that the obstacles prevent research activities in Nigeria's tertiary research institutions, including a lack of funding, professional mentorship, and inadequate research facilities. Bahadori et al. (2015) classified six challenges of the research system: barriers to the design and development, approval of research projects, the implementation of research projects, administrative and managerial issues, personal problems, publishing articles, and guidelines and recommendations.

The main barrier the ECRs faced in Kazakhstan was that the status of a "young scientist" and the age limits were not legally defined for a long time. It caused difficulties for ECRs in receiving

research funding, implementing initiatives to support young scientists at universities, and developing and testing mechanisms for ECRs' motivation. All of these aimed to maintain the interest of young teachers in academic and research activities (Teslenko, 2017).

As stated by Duisenova (2020), the objective difficulties include the lack of research funding in the country – both by the Ministry of Education and the Scientific Foundations (mainly "Samruk Kazyna"), the lack of national funding, low wages for young scientists, insufficient number of grants for doctoral studies, and inability to apply for doctoral studies. Subjective difficulties comprise the lack of sufficient research capacity, the lack of young scientists, and undeveloped fundraising activities for students to have an opportunity to participate in competitions arranged by international scientific institutions. More importantly, poor knowledge of a foreign language does not allow using various methodological foreign sources and foreign experience to the full extent.

Abdirayimova et al. (2019, p. 123) state that the primary factors affecting the ECRs' working conditions and career prospects such as "a large workload associated with official duties, limited opportunities for career advancement, low awareness of employment alternatives, and possible sources of funding for research projects." "Moreover, ECRs employed in science and higher education are not satisfied with wages, career opportunities, and academic mobility options" (Abdirayimova et al., 2019, p. 123).

The National Report "Youth of Kazakhstan – 2021: 30 years of Independence" (2021, p. 167) states the barriers in Kazakhstani science. They include uncompetitive research staff (little or incomplete information about Kazakh scientists and their scientific developments in open sources and no single database of researchers), low commercialization of research by ECRs, and weak investment attractiveness of science. Moreover, lack of experience in co-financing scientific research and stimulating business through the provision of benefits and preferences, lack of effective incentive mechanisms for the private sector to develop products using scientific achievements exist. Other serious issues are poor equipment of scientific organizations and laboratories requiring updating their material and technical equipment and a minimal number of Kazakhstani journals in international databases.

However, the literature review outlined a gap, such as the lack of understanding of the regional university ECRs' research engagement, barriers, and needs. The stated research specifics and barriers in Kazakhstani science are mainly relevant to the top universities in the biggest cities of

Kazakhstan, and no research addressing these issues at the regional universities exists. Therefore, this study aims to investigate the ECRs' research engagement, needs, and barriers to doing research at the regional universities of the Republic of Kazakhstan.

Methodology

Research Design

In connection with the research problem and the research questions, this study used a mixed methods research design, the best approach for clearly identifiable cases providing an in-depth understanding (Creswell, 2013) and offering unique methodological advantages for researchers wishing to address the complexity of these research problems and issues (Plano et al., 2018).

The study included data collection, measurement, and analysis. It employed the following research methods: (1) a survey of Kazakhstani regional universities' early career researchers and (2) interviews with Vice-Rectors for Research of regional universities of West Kazakhstan. The aim was to expand the understanding of the university academic staff's research engagement specifics, their needs, and barriers to research at the Kazakhstani regional universities.

The data collection was conducted at ten regional higher education institutions of the Republic of Kazakhstan located in Aktau, Aktobe, Atyrau, and Oral (West Kazakhstan) from June to August 2022.

The quantitative research data were analyzed through SPSS Statistics software combining several methods such as descriptive statistical analysis, reliability analysis, Spearman's rank correlation analysis, and Pearson chi-square test of significance. The qualitative research data were interpreted through content and thematic analysis. Based on this, the study results were summarized, and the implications and limitations of the study were presented.

Sample

The survey sample comprised one hundred and twenty people, with an average age of 33.4 (SD = 4.4) in the 23–40 years. The study employed a non-probability sampling technique. Convenience sampling was performed through the WhatsApp instant mobile messaging. The inclusion criteria were universities' ECRs ≥40 years of age (96.8%). The rationale for excluding respondents older than 40 years of age is based on the age limit for young researchers in Kazakhstan set for the young researchers by the requirements of grant projects under the Ministry of Science and Higher

Education of the Republic of Kazakhstan, university Boards of Young Scientists, regulations and other documents.

Table 1 displays demographic information about the survey participants.

Table 1

ECRs' Demographic Characteristics (N = 120)

Demographic Information	Frequency	Percentage
Regions		
Aktau city and Mangystau region	1	0.83
Aktobe city and Aktobe region	31	25.8
Atyrau city and Atyrau region	24	20
Oral city and Western Kazakhstan region	64	53.3
Gender		
Male	31	25.8
Female	89	74.2
Specialization		
Humanities and Social Sciences	66	55
Natural Sciences	31	25.83
Technical	22	18.33
Medicine and Public Health	1	0.83
Teaching Experience		
0-4 years	38	31.7
5-9 years	30	25
10+ years	52	43.3
Level of Education		
Bachelor's	2	1.66
Master's	91	75.8
Doctorate (Ph.D.)	21	17.5
Candidate of Sciences (Ph.D.)	5	4.17
Doctor of Sciences	1	0.83

Source: author's elaboration based on the statistical analysis

Purposeful sampling was used for choosing respondents for the interview. As specified by the research questions, the participants of the interview-based study included seven Vice-Rectors for Research of the regional universities of Aktau, Aktobe, Atyrau, and Oral, agreeing to be interviewed. The data were anonymized properly, aligning with the ethical guidelines of the

studies, not requiring ethical approval, and informed consent was obtained from the respondents during interviews.

Research Instrument

The study used both qualitative and quantitative methods. A descriptive survey was conducted among ECRs from the ten regional universities of Aktau, Aktobe, Atyrau, and Oral. The online questionnaire in Google Forms was shared with the universities' ECRs through WhatsApp groups of University Councils of Young Researchers. The questionnaire included items on the ECRs' demographics (age, gender, specialization, teaching experience, level of education, research direction, and region), knowledge of languages, ECRs' publication rate and research engagement frequency, reasons for conducting research and barriers. Items on ECRs' reasons for conducting research and barriers were adapted from the questionnaire used by Jamoom & Al-Omrani (2021). For collecting qualitative data, an exploratory semi-structured interview, an effective method in exploring participant thoughts, feelings and beliefs about a particular topic, was used to introduce more detail and richness due to its open-ended nature. Interviews with the university Vice-Rectors for Research were designed to have an in-depth picture of ECRs' research perspectives in regional universities of West Kazakhstan. The interview included questions on stimulation and institutional support of ECRs' research activities (Questions 1-2, 6), ECRs' barriers (Q3), a position of "teacher-researcher" at the university (Q4), and measures to be undertaken by the university administration to support ECRs (Q5). Based on the interview data, the key obstacles impeding ECRs from conducting research at Kazakhstani regional universities were identified, and their needs and barriers were classified.

In line with ethical considerations, the survey respondents were contacted with the university administration's permission and signed a letter of consent containing information on the study. The potential interviewees received the consent forms before starting the interview and were informed of the essential information in the study, their rights, and privacy.

The concurrent validity of the study was reached by comparing the survey results with the interview. Table 2 displays testing scale quality.

Table 2

The Quality of the Scale with Cronbach's Alpha Coefficients (N = 120)

Scale	Cronbach's Alpha	Conclusion
Research engagement specifics	0.836	Good
Barriers to doing research	0.898	Good

Source: author's elaboration based on the statistical analysis

The scale reliability of the variables is of good quality, and Cronbach's Alpha coefficient is > 0.8. Thus, the scales have good quality, high reliability, and good use.

Data Collection

The quantitative data were obtained by sending the invitation to participate in the survey, and the link to the questionnaire in Google Forms to the regional university ECRs through the WhatsApp social media platform. On-site interviews with the regional universities' Vice-Rectors for Research were conducted to obtain qualitative data on the research topic. Being the experts in the field, all interviewees properly answered the questions. The data saturation was achieved, for, according to Morgan et al. (2002), the first five to six interviews produce the majority of new information in the dataset, and little new information is gained as the sample size grows.

Data Analysis

The quantitative research data were coded in MS Excel program and further analyzed using SPSS descriptive statistics, Spearman's rank correlation analysis, and Pearson chi-square test of significance. Tables 3-5 present the summaries of statistical analysis in the form of frequencies and frequency distributions.

The qualitative research data, that came from the interviews' transcripts, were analyzed through content and thematic analysis. The purpose of content analysis, which is used to describe the characteristics of the collected data content by systematic coding and categorizing (Gbrich, 2007), was to determine trends and patterns of words used, their frequency, their relationships, and the structures and discourses of communication. Being "a method for identifying, analysing and reporting themes within data" (Braun & Clarke, 2006, p. 79), the thematic analysis implied a careful study of the collected data multiple times in order to spot emerging patterns, themes, and sub-themes, and to categorize data into different sections.

Results

The Research Attitudes (Research Engagement Frequency, Reasons for Doing Research) of the Academic Staff Undertaking the First Stages of Their Research Careers at the Kazakhstani Regional Universities

Table 3 displays the ECRs' frequency of conducting research. However, the subjectivity of respondents' frequency descriptors (often, sometimes, rarely, and never) in executing research should be stated, as they might not refer to the respondents' research engagement's accurate frequency (Borg, 2009).

Table 3

The ECRs' Research Engagement Frequency

Frequency	N	%
Often	76	63.3
Sometimes	25	20.8
Rarely	15	12.5
Never	4	3.3
Total	120	100.0

Source: author's elaboration based on the statistical analysis

Table 3 demonstrates that most ECRs are often engaged in research (76%), and only 3.3% stated that they never conduct research.

Table 4 presents descriptive statistics of the ECRs' reasons for conducting research categorized by the total sample of respondents and their gender.

Table 4

The ECRs' Research Engagement Reasons

I conduct research	Total Sample (N=120)		Male (N=31)		Female (N=89)	
	Mean	SD	Mean	SD	Mean	SD
because it is good for my professional development	4.191667	0.802264	4.387097	0.667204	4.123596	0.836935
because it enhances my teaching skill	4.108333	0.848091	4.193548	0.749193	4.078652	0.881949
because it will help me get the promotion	4.100000	0.813747	4.096774	0.943569	4.101124	0.769370
to promote my self-confidence as a teacher	4.108333	0.828036	4.193548	0.703295	4.078652	0.868969
to become more critical and analytical about my teaching practices	4.141667	0.689609	4.000000	0.730297	4.191011	0.672113
to develop my research skills	4.350000	0.589117	4.419355	0.564163	4.325843	0.598773
to raise my awareness of my students' needs	3.833333	0.853400	3.741935	0.893224	3.865169	0.841954

Source: author's elaboration based on the statistical analysis

The ECRs' overall research engagement is actualized by researching to develop research skills (m = 4.35) because it is good for their professional development (m = 4.19) and makes them more critical and analytical about their teaching practices (m = 4.14).

From the ECRs' gender perspective, men are mainly found to engage in research to develop research skills (m = 4.41) because it is good for professional development (m = 4.38), promotes self-confidence as a teacher (m = 4.19) as it enhances teaching skill (m = 4.19). Nonetheless, women usually conduct research to develop research skills (m = 4.33), to become more critical and analytical about teaching practices (m = 4.19) because it is good for professional development (m = 4.12), and it will help them get the promotion (m = 4.10).

Figure 2 presents ECRs' publication activity in the last five years, according to which 65.8% of ECRs were published in the journals from the list of the Committee for Quality Assurance in the Sphere of Education and Science of the Ministry of Education and Science of the Republic of Kazakhstan (CQASES). The list has 1-5 papers – 51.7%, 6-10 papers – 12.5%, 11-15 papers – 1.7%; 32.5% of respondents have publications in journals indexed in Scopus database (1-5 – 30%, 6-10 – 2.5%,), and 20.8% – in Web of Science indexed journals (1-5 – 18.3%, 6-10 – 2.5%). However, most ECRs do not have any publications either in the Scopus (67%) or in the Web of Science (79%) indexed journals. 34% of ECRs have not been published in the journals from the CQASES list in the last five years.
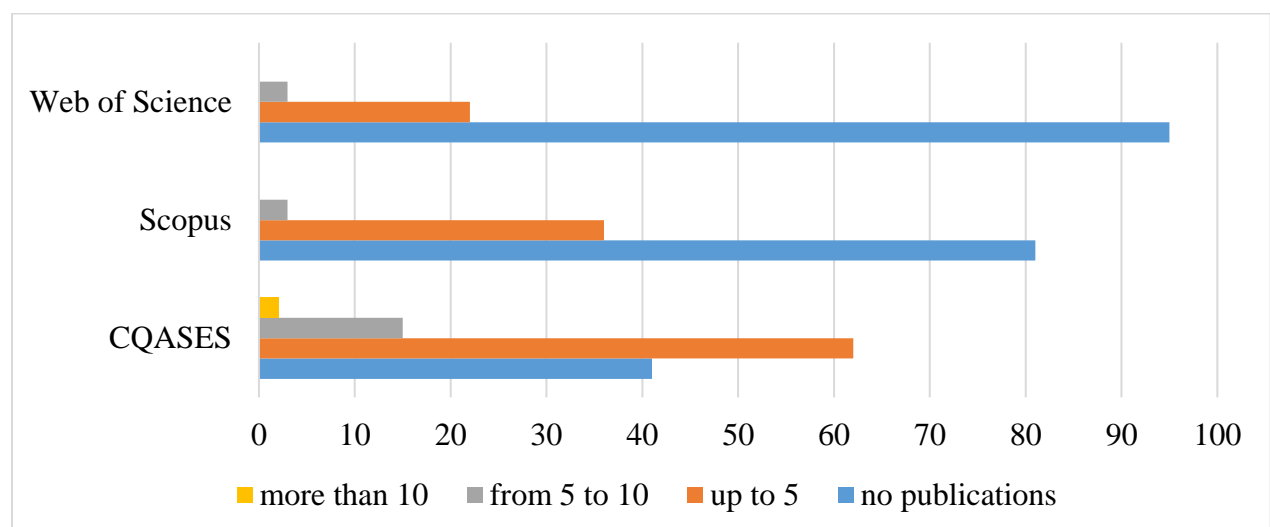

Figure 2. ECRs' Publishing Rate in the Years from 2018 to 2022 (N=120)

Given that both qualitative and quantitative data contribute to the understanding of the research topic (Kuzembayeva et al., 2022), combining them delivers significant benefits, enabling the comparison and contrasting of the results and gaining much deeper insights. Quantitative research highlighted the important variations in ECRs' reasons for doing research and publication trends. Qualitative research adds to an in-depth understanding of the ECRs' research attitudes and coming up with fresh concepts in their research engagement frequency and reasons for doing research. The analysis of the interviews with the Vice-Rectors for Research (S1-S7) from the universities of Aktau, Aktobe, Atyrau, and Oral revealed the ECRs' research specifics at the regional universities of the Republic of Kazakhstan.

When answering the first interview question (Q1. Does your university have a Regulation on stimulating research activities?), more than half of the interviewees (57.2%) stated that a Regulation exists to stimulate research activities at their institution. Though, as stated by S4, the university provides bonuses to employees, including young scientists, for publishing articles in high-ranking journals with a percentile of at least 35. According to S5, *"universities are developing Regulations on R&D, but this incentive, especially in private universities, is not considered at all or is "rudimentary," as it is limited to cash prizes, moral incentives as diplomas, letters of appreciation during the Week of Science and other university events, and it suggests that there is no system, and it is not documented."*

When answering the question on the separate system of support for the R&D of young scientists at universities (Q2. Is there a separate system of support for the R&D of young scientists and what does it consist of?), most sample (71.4%) stated that no targeted university support exists for ECRs. The following support measures are provided for ECRs:

According to S1, *"five scientific schools of leading researchers function at the university providing scientific support to ECRs; university seeks for obtaining targeted grants for admission to doctoral programs; the financial assistance is provided during the preparation for the thesis defense; and for the period of study, an ECR retains a job at the university.''*

As stated by S4, *"support for ECRs is carried out by allocating part of the extrabudgetary funds of the University for their training in postgraduate studies in the Russian Federation and doctoral studies in the Republic of Kazakhstan. The Council of Young Scientists functions at the university".*

Most universities (71.4%) have launched the position of a teacher-researcher, and *"the university academic staff would provide only 0.5 teacher workload; the rest would be allocated to research under the Labor contract"* (S5).

ECRs will enter this position according to the requirements (S4) because the position will start on September 1, 2022. Due to the innovative character of this procedure for Kazakhstani regional universities, it is too early to determine the share of ECRs in this position.

While answering the Q5 of the interview (What can be done to support ECRs at the university?) The respondents proposed the following:

"Increase the number of paid science internships in leading domestic and foreign universities; Organize creative business trips to research institutes and research centers" (S1);

"Launch a specific state program to support ECRs" (S2);

"Foster the ECRs' general literacy through the real-time practical advanced training on a systematic basis, the exchange of best practices with specialized universities and research centers; Involve the academic staff up to forty years old to work in foreign research centers for one or two semesters in their fields;

Open research centers in each university, with the provision of favorable work for the teacher-researcher – reducing the teaching load in favor of research work" (S3);

"Introduce a rule of applying for doctoral programs a year before;

Change the requirements for confirming the English language proficiency (IELTS Academic, TOEFL (IBT, PBT, ITP): the level of language proficiency should have a minimum value (IELTS Academic 3.0- 4.0), and upon completion of doctoral studies, it should be developed to 5.5-6.0" (S4);

"Develop a system for monitoring and supporting ECRs" (S5);

"Increase interinstitutional research funding" (S6);

"Reduce the teacher workload, increase the research component following personal achievements;

Activate the participation in competitions for grant funding;

Encourage high achievements in science, both at the local level and at other levels (city, region, etc.);

Motivate for action, stimulate results, and enhance interest in the problems of Kazakhstani science" (S7).

While answering the Q6 of the interview; Can the university, during ECRs' submitting and implementing scientific projects, afford to take on all the accompanying organizational, legal, and reporting documentation at the stages of applying, concluding a contract, drawing up expenses, and preparing reports so that the ECRs would deal only with research? The university Vice-Rectors for Research stated that the ECRs support preparing research proposals (organizational and legal assistance) at the level of the University Science Departments (S1 and S6). S4 and S5 state that such kind of university support is possible; it can be provided in case of hiring additional specialists (S2 and S7).

The Early Career Researchers' Barriers to Their Engagement in Research

Table 5 presents barriers of ECRs to conducting research.

Table 5

Barriers to doing research

Barriers	Mean	SD	Min	Max
I do not have time to conduct research.	3.583333	1.104485	1.000000	5.000000
I do not have access to the books and journals I need.	2.866667	1.044661	1.000000	5.000000
My employer does not support me in researching.	2.941667	1.117439	1.000000	5.000000
I do not have enough knowledge and skills required to conduct quality research.	2.666667	1.047874	1.000000	5.000000
Nothing motivates me to execute research.	2.716667	0.997335	1.000000	5.000000
I need mentoring from professionals having experience in research, yet no one is available.	3.091667	1.045164	1.000000	5.000000
It is difficult to get my research published, so others cannot benefit from its findings.	3.133333	1.028447	1.000000	5.000000
The learners and other teachers would not cooperate if I asked for help.	2.983333	1.045063	1.000000	5.000000
There is nothing worth researching in our work.	2.383333	0.851922	1.000000	5.000000
I am not interested in researching as I believe my job is to teach, not to execute research.	2.333333	0.910567	1.000000	5.000000

Source: author's elaboration based on the statistical analysis

The main research challenges that the ECRs confront include the lack of time to conduct research (m = 3.58), the difficulty in publishing research (m = 3.13), and the need for research mentoring from experienced professionals (m = 3.09).

The ECRs' barriers to doing research were also identified due to the interviews with the regional universities' Vice-Rectors for Research (Q3. What barriers do you face in organizing the R&D of

ECRs?). As a result of the qualitative analysis of the interview data with the universities' Vice-Rectors for Research, the ECRs' research barriers include the following:

"A low basic training as a specialist" (S2),

"A low level of the research culture of ECRs, a weak motivation to improve knowledge and, thus, passivity to research work, practical ignorance of the scientific apparatus and structure of research, weak knowledge of advanced research in the world, in the republic, and the region" (S3);

"ECRs' excessive academic workload, lack of personal motivation and interest, an insufficiently well-developed mechanism for supporting young scientists at the state level" (S7);

"Social and psychological issues as lack of time (study and additional workload), misunderstanding of the university management (ignoring, unfavorable team environment), difficulties in finding an object and information for research (business entities do not interact with research centers and scientists; therefore, local representative bodies of the region should oblige them to cooperate with universities). Moreover, the university itself should probably increase the attractiveness and positioning at the level of the region, republic, as well as take measures to avoid the material and organizational deficits" (S5).

The main barrier to capacity building of ECRs, according to S4, is *"the requirement of having publications in journals with certain scientometric indicators when applying for research funding of the Science Committee of the Ministry of Education and Science of the Republic of Kazakhstan within the framework of the competition for young scientists."* Hence, *"ECRs' disbelief in the outcome of the grant applications and indifference"* is provoked (S6).

For overcoming research barriers, S1 speculates that *"it is necessary to create several conditions: (1) introduction of a creative day (library day), (2) reducing the teacher workload of promising ECRs, (3) payment of expenses for the publication of articles in high-ranking peer-reviewed journals."*

The Relationship between the Early Career Researchers' Language Skills, Research Engagement Frequency, and Barriers to Conducting Research

Figure 3 displays ECRs' language (Kazakh, Russian, and English) proficiency levels.
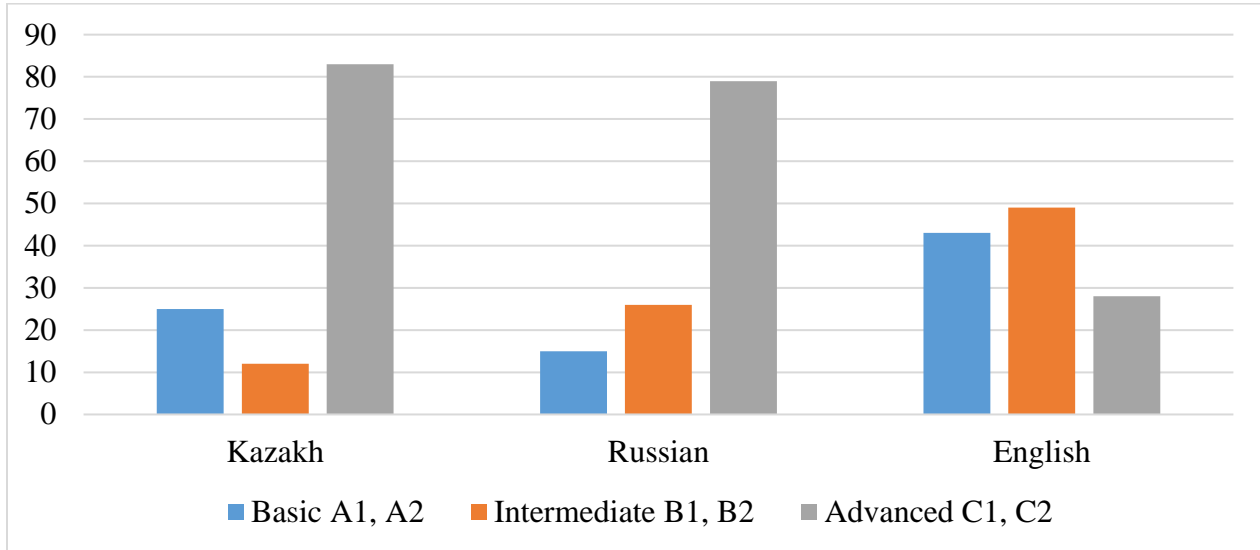

Figure 3. ECRs' Language Proficiency Levels

Up to 70% of ECRs acquire an advanced level of Kazakh and Russian. Most respondents are fundamental English users (35.8%) and English independent users (40.8%).

Correlation analysis was conducted to determine the relationships between the ECRs' knowledge of languages and the research barriers of the respondents. For the non-normal distribution of the research data with the sample size of one hundred and twenty people the Spearman's rank correlation coefficient was selected (McDonald, 2014); correlations were considered significant at $p < 0.05$.

Table 6

Spearman's Rank Correlation Coefficient for the Knowledge of Languages

Items	Kazakh	Russian	English
Kazakh	1.000000		
Russian	**0.336992**	1.000000	
English	**-0.197885**	0.067584	1.000000

Significant at the p<0.05 level

Source: author's elaboration based on the statistical analysis

Table 6 demonstrates a positive correlation between the ECRs' knowledge of the Kazakh and Russian languages and a negative correlation between their level of Kazakh and English. It

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indicates that the Kazakhstani regional universities' ECRs are primarily bilingual (Kazakh-Russian), and those speaking only the Kazakh language have a lower level of English.

Table 7 reports the findings of Spearman's rank correlation coefficient for the ECRs' knowledge of languages and their research barriers (lack of knowledge and skills in conducting research, lack of motivation, challenges in publishing, and no interest in researching).

Table 7

Spearman's Rank Correlation Coefficient for the ECRs' Knowledge of Languages and Research Engagement, and research barriers

Items	REF	Lack of knowledge & skills	Lack of motivation	Challenges in publishing	No interest
Kazakh	0.012643	-0.055632	-0.002966	0.000650	-0.161701
Russian	**0.194282**	**-0.367165**	**-0.313532**	-0.110937	**-0.353857**
English	**0.194194**	**-0.266289**	-0.169775	-0.075421	-0.041351

REF – Research Engagement Frequency; Significant at the p<0.05 level

Source: author's elaboration based on the statistical analysis

A statistically significant correlation ($p<0.05$) exists between the knowledge of English and Russian languages and the research engagement frequency, barriers to conducting research, such as the lack of knowledge and skills in executing research, the lack of motivation, and no interest. Those speaking Russian depict a higher level of interest and motivation for researching and have the required knowledge and skills; the latter is also relevant for the ECRs speaking English. The knowledge of English and Russian contributes to the ECRs' research engagement.

Table 8 displays Spearman's rank correlation coefficient for the ECRs' research barriers (lack of knowledge and skills in conducting research, lack of motivation, challenges in publishing, and no interest in researching) and their research engagement frequency.

Table 8

Spearman's Rank Correlation Coefficient for the ECRs' Research Barriers and Research Engagement Frequency

Items	REF	Lack of knowledge & skills	Lack of motivation	Challenges in publishing	No interest
REF	1.000000				
Lack of knowledge & skills	**-0.354921**	1.000000			
Lack of motivation	**-0.232499**	**0.612173**	1.000000		
Challenges in publishing	-0.090714	**0.344432**	**0.495212**	1.000000	
No interest	**-0.213138**	**0.599286**	**0.561052**	**0.306012**	1.000000

REF – Research Engagement Frequency; Significant at the p<0.05 level

Source: author's elaboration based on the statistical analysis

Table 8 illustrates a statistically significant correlation ($p<0.05$) between the ECRs' research barriers. ECRs' research engagement frequency is negatively correlated with the research barriers such as lack of knowledge and skills in conducting research, lack of motivation, and no interest in researching.

The Relationship between the ECRs' Research Directions and Research Attitudes

The Pearson chi-square test of independence was determined to discover whether a relationship exists between the research directions and research attitudes of ECRs.

Chi-square Analysis Hypothesis:

Ho: ECRs' research direction and research attitudes are independent.

Ha: ECRs' research direction and research attitudes are not independent.

Decision Rule: If the p-value is less than the cut-off point (significance level) of 0.05, reject the null hypothesis.

Table 9

Chi-square Test of Independence

Variable	Degrees of freedom	Research Direction		Cramer's *V*
		chi-square	*p*-value	
Doing Research for Enhancing Teaching Skills	12	22.67130	**p=.03065**	.2509499
Applying for Research Grants	3	7.955164	**p=.04695**	.2574743
Getting Research Grants	3	8.438145	**p=.03777**	.2651752

Significance at the level p<0.05

Source: author's elaboration based on the statistical analysis

Pearson chi-square test demonstrated a significant relationship (p-value < 0.05) between the ECRs' research directions and their research attitudes, such as conducting research for enhancing teaching skills, applying for research grants from the Ministry of Education and Science of the Republic of Kazakhstan, and getting research funding. It implies that these variables are not independent, meaning an association exists between them since the p-values are less than 0.05. Cramer's V correlation coefficient (value of 0 = no relationship, 0.2 or less = weak relationship, from 0.21 to 0.3 = moderate, and above 0.3 = strong relationship) was considered.

Table 10

*Research Direction * Conducting Research for Enhancing Teaching Skills Crosstabulation*

Research Direction	Conducting Research for Enhancing Teaching Skills					Total
	1*	2*	3*	4*	5*	
Humanities and Social Sciences	0	5	5	32	24	66
% within RD	0.00%	83.33%	38.46%	54.24%	58.54%	
% within ETS	0.00%	7.58%	7.58%	48.48%	36.36%	
% of Total	0.00%	4.17%	4.17%	26.67%	20.00%	55.00%
Natural Sciences	0	0	1	19	11	31
% within RD	0.00%	0.00%	7.69%	32.20%	26.83%	
% within ETS	0.00%	0.00%	3.23%	61.29%	35.48%	
% of Total	0.00%	0.00%	0.83%	15.83%	9.17%	25.83%
Technical Sciences	1	1	7	8	5	22
% within RD	100.00%	16.67%	53.85%	13.56%	12.20%	
% within ETS	4.55%	4.55%	31.82%	36.36%	22.73%	
% of Total	0.83%	0.83%	5.83%	6.67%	4.17%	18.33%
Medicine and Public Health	0	0	0	0	1	1
% within RD	0.00%	0.00%	0.00%	0.00%	2.44%	
% within ETS	0.00%	0.00%	0.00%	0.00%	100.00%	
% of Total	0.00%	0.00%	0.00%	0.00%	0.83%	0.83%
Total	1	6	13	59	41	120
% of Total	0.83%	5.00%	10.83%	49.17%	34.17%	100.00%

RD – Research Direction; ETS – Doing Research for Enhancing Teaching Skills; 1-5 – 5-point*

Likert Scale: 1 – very low; 5 – very high; p-value < 0.05.

Source: author's elaboration based on the statistical analysis

Table 11

*Research Direction * Applying for Research Grants / Getting Research Grants Crosstabulation*

Research Direction	Applying for Research Grants			Getting Research Grants		
	Did not apply	Applied	Total	Did not get	Got	Total
Humanities and Social Sciences	46	20	66	61	5	66
% within RD	61.33%	44.44%		56.48%	41.67%	
% within ARG/GRG	69.70%	30.30%		92.42%	7.58%	
% of Total	38.33%	16.67%	55.00%	50.83%	4.17%	55.00%
Natural Sciences	13	18	31	24	7	31
% within RD	17.33%	40.00%		22.22%	58.33%	
% within ARG/GRG	41.94%	58.06%		77.42%	22.58%	
% of Total	10.83%	15.00%	25.83%	20.00%	5.83%	25.83%
Technical Sciences	15	7	22	22	0	22
% within RD	20.00%	15.56%		20.37%	0.00%	
% within ARG/GRG	68.18%	31.82%		100.00%	0.00%	
% of Total	12.50%	5.83%	18.33%	18.33%	0.00%	18.33%
Medicine and Public Health	1	0	1	1	0	1
% within RD	1.33%	0.00%		0.93%	0.00%	
% within ARG/GRG	100.00%	0.00%		100.00%	0.00%	
% of Total	0.83%	0.00%	0.83%	0.83%	0.00%	0.83%
Total	75	45	120	108	12	120
% of Total	62.50%	37.50%	100.00%	90.00%	10.00%	100.00%

ARG – Applying for Research Grants; GRG – Getting Research Grants; p-value < 0.05.

Source: author's elaboration based on the statistical analysis

Discussion

The quantitative study results depict the ECRs' research engagement, their barriers in conducting research (the lack of time to conduct research, the difficulty in publishing research, and the lack of research mentorship and university support), and the relation of ECRs' knowledge of languages to their research experience and research directions. The qualitative study results indicate that there are no targeted university support policies for the ECRs except scientific schools, financial motivation for publishing in high-ranked journals, and partial sponsorship of postgraduate studies at some universities.

This study determined a discrepancy between the ECRs' attitudes and engagement in research, as well as significant barriers impeding these activities. Jahan et al. (2015), Hegde et al. (2017), and Okoduwa et al. (2018) reported similar findings. The current research is the first study examining the ECRs' research engagement specifics, needs, barriers, and their interrelation in the regional universities of the Republic of Kazakhstan.

The study revealed that the ECRs are often engaged in research (80%), stating the reasons for conducting research, such as developing research skills, its value for their professional development, and becoming more critical and analytical about their teaching practices. However, most ECRs do not have any publications either in the Scopus (67%) or Web of Science (79%) indexed journals, and 34% of ECRs have not been published in the journals from the CQASES list in the last five years. This finding relates to the other result obtained from the interviews held in the research administration at seven universities in West Kazakhstan. The interviews identified that no targeted university support exists for ECRs. Some universities' support measures for the ECRs are scientific schools, financial motivation for publishing in high-ranked journals, and partial sponsorship of postgraduate studies.

From the gender perspective, the female ECRs' reasons for research engagement include receiving a career promotion. In contrast, the common reasons among male respondents comprise improving research skills, teaching practices, and professional development. Shvetsova (2021) explains this finding, stating that the level of gender culture within the scientific community is heterogeneous, a barrier-forming factor in the professional development of young scientists.

ECRs' research challenges, resulting from the descriptive survey, include the lack of time to conduct research, the difficulty in publishing research, and the need for research mentoring from experienced professionals. This result aligns well with the previous study of O'Connor et al.

(2011), wherein they stated that academic faculty could not balance teaching and research because of an overload situation: the barriers impeding the balance include continually preparing new classes every semester, heavy teaching loads, having a large class size, and having other administrative responsibilities. The findings also reflect the general trends currently observed in scientific publishing and informal discussions with editors from peer-reviewed journals as dealing with long review (or desk rejection) times and poor reviews (Hausmann & Murphy, 2016; Mrowinski et al., 2020). It is consistent with what Mackay et al. (2020) have found in that the soft skills of paper writing, communication skills, and grant proposal writing are the most useful for the ECRs' capacity development and are identified as being best developed through a mix of experiential learning, including adequate mentoring, supervisory support, doctoral research and attendance of conferences and workshops. Thus, in line with the ideas of O'Connor et al. (2011), one can conclude that "universities need to equip faculty members with support strategies for successful and thoughtful upward movement as opposed to being caught in an unbalanced drift."

According to the interviewed Vice-Rectors for Research at the Kazakhstani regional universities, a low level of basic research knowledge and culture of ECRs, lack of motivation, lack of time due to excessive teacher workload, lack of personal motivation, and undeveloped mechanism for supporting ECRs at the state level, difficulties in applying for research funding are among the ECRs' research challenges.

The interviewed Vice-Rectors for Research at the Kazakhstani regional universities consider that it is necessary to create several conditions, such as reducing the workload of the ECRs by launching a teacher-researcher position at the university and giving them a day off ("creative" day). Moreover, providing financial support schemes for the ECRs' open-access publishing, ECRs' research capacity building through training, international science internships, academic mobility, and assistance in applying for research funding are also critical. All will help overcome the ECRs' research barriers. These points are consistent with the previous research from Saudi Arabia (Alamri et al., 2020), stating that it is necessary to foster the ECRs' research interest by providing scholarships and research bursaries.

Another promising finding identified by employing Spearman's rank correlation analysis was that a positive correlation exists between the ECRs' knowledge of the Kazakh and Russian languages and a negative correlation between their level of the Kazakh and English languages. It indicates that the Kazakhstani regional universities' ECRs are mostly bilingual (Kazakh-Russian), and those

speaking only the Kazakh language have a lower level of English. ECRs' knowledge of Russian and English languages is significantly ($p<0.05$) correlated with their research engagement frequency. Speakers of the Russian language experience fewer research challenges, such as a lack of knowledge and skills, lack of motivation, and no interest in research. The knowledge of the English language negatively correlated with the ECRs' barrier in conducting research as a lack of knowledge and skills. This result directly aligns with previous findings of Kuzembayeva et al. (2018) that knowing languages would prepare youth for their future professions and enhance their social experiences.

A significance test was conducted using the Chi-square method to establish whether the ECRs' research directions and their research attitudes and barriers in conducting research are independent. The p-value <0.05 indicated that a statistically significant relationship exists between the ECRs' research directions and the ECRs' conducting research for enhancing teaching skills, applying for and getting research grants and that these categorical variables are not independent. Notably, the ECRs' research barriers are interrelated. ECRs' research engagement frequency is negatively ($p<0.05$) correlated with the research barriers such as lack of knowledge and skills in conducting research, lack of motivation, and no interest in research. Pearson chi-square test revealed that the ECRs' ability to navigate research barriers and use positive openings (applying and getting research funding) appear to differ significantly ($p<0.05$) related to their research direction. These findings agree with the findings by Fenton et al. (2016) that the researchers' previous experience and particular areas of study influence research success.

Due to the anonymous nature of this research, the likelihood of bias is reduced. Though, this does not sideline the limitation of the current study relying on self-report measures as provided by the respondents.

Conclusion

The study resulted in essential findings in understanding the ECRs' research engagement and the obstacles impeding them from conducting research. Most ECRs are often engaged in research to develop their research skills, become more critical and analytical about their teaching practices, and boost their professional development. Interviews with the universities' research administration highlighted that no targeted university support policies exist for the ECRs. Some universities are limited to scientific schools, financial motivation for publishing in high-ranked journals, and

partial sponsorship of postgraduate studies. The regional university ECRs' barriers to research are the lack of time to conduct research, the difficulty in publishing research, the need for mentoring by experienced peers, and university support. The study's results concerning the relation of the ECRs' knowledge of languages to their research experience highlight the vitality of the policy of trilingualism in Kazakhstan, contributing to the successful integration of Kazakhstani ECRs into world science. The association of the ECRs' research directions with their (1) conducting research for enhancing teaching skills, (2) applying for research grants, and (3) getting research funding adds to a deeper understanding of the ECRs' research needs and barriers.

The findings confirm that the Kazakhstani regional universities' ECRs need specifically targeted policies to facilitate their research careers. Due to the anonymous nature of this research, the likelihood of bias is reduced. Though, this does not sideline the limitation of the current study relying on self-report measures as provided by the respondents. This study's findings could be the foundation for future research on the needs and barriers of ECRs at the universities of other regions of the Republic of Kazakhstan that may contribute to developing informed policies for promoting teacher research engagement and fostering the ECRs' research capacity.

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