



DETERMINING THE STUDENTS' ATTITUDE TOWARDS RESEARCH: AN EXPLORATORY FACTOR ANALYSIS

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Abstract:

This research endeavors to delve into the underlying attitudes of criminology students toward research. An extensive review of theories and literature concerning students' perceived attitudes toward various subjects was conducted to accomplish this objective. Furthermore, data were collected from 50 criminology students to gauge their attitudes towards research. Drawing from this data, a comprehensive set of statement items was formulated to capture the identified attitudes accurately. These items underwent meticulous validation by a panel of experts to ensure their reliability and relevance to the study's objectives. Subsequently, the validated items were administered to a larger sample comprising 245 criminology students. Employing Exploratory Factor Analysis, the study uncovered three primary attitudes toward research: Research Application for Education and Career, Personal Engagement and Development, and Personal Advancement. This systematic approach sheds light on the diverse perspectives of criminology students regarding research. It provides valuable insights for educators to tailor teaching methods effectively to meet students' needs and interests in research.

Keywords: attitude, research, criminology students, Philippines

1. Introduction

Improving the completion of research requires dedication and effort. A positive attitude towards the task at hand is crucial for success in conducting research (Hussain *et al.*, 2016). Research serves as a fundamental resource for individuals seeking to transform their way of life, unlocking new opportunities across various domains. Its pivotal role in advancing humanity underscores its intrinsic importance (Imran *et al.*, 2019). Given the growing recognition of research's significance, many academic institutions now mandate research components in professional courses. However, despite the necessity, numerous

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students struggle to complete their research within deadlines, often due to inadequate study habits, writing skills, and alignment with their professional goals.

Understanding students' attitudes towards research is crucial for teachers to develop effective teaching strategies that can enhance their interest in the subject. While various studies have investigated student attitudes in subjects like Mathematics (Ruffell *et al.*, 1998; Farooq & Shah, 2008; Kartowagiran & Manaf, 2021; Mazana *et al.*, 2019), Science (Osborne *et al.*, 2003; Anwer, Iqbal & Harrison, 2012; Kurniawan *et al.*, 2019), English (Zulfikar, Dahliana, & Sari, 2019; Sinaga & Pustika, 2021), and Social Studies (Fuentes & Gono, 2023), there has been a notable gap in research focusing on the attitudes of criminology students towards research. Problems in relation to finishing research on time have been occurring in medicine (Gagnon *et al.*, 2007; Carter *et al.*, 2018), master's degree programs (Comley-White & Potterton, 2018), doctoral programs (King & Williams, 2014), and in the undergraduate program (Nolan *et al.*, 2020). To address this problem, institution establishes many intervention programs such as coaching (Nolan *et al.*, 2020), direct participation in the conduct of research (Adebisi, 2022), and increasing knowledge in research and direct supervision (Assar *et al.*, 2022). However, none of this research conducted is grounded in the roots of the problem through interviews and surveys.

Scholars advocate for a combination of interviews and surveys as an effective method for identifying the root causes of problems and devising tailored solutions within educational contexts (Beatty & Willis, 2007; Rosenthal, 2016; Hancock, Algozzine, & Lim, 2021; Ravitch & Riggan, 2016; McKim, 2017). This approach has been successfully employed in various domains, including supporting engagement in mathematics and science learning (Fredricks *et al.*, 2018), fostering meaningful learning in mathematics (Gono & Pacoy, 2018) and statistics (Griffith *et al.*, 2012), and understanding teachers' attitudes towards ethnic mathematics (Khalil, 2023). By combining qualitative insights from interviews with quantitative data gathered through surveys, researchers can gain a comprehensive understanding of complex educational issues, thereby facilitating the development of targeted interventions and strategies for improvement (McKim, 2017). This integrative approach allows for nuanced analyses that consider the diverse perspectives and contexts inherent in educational settings, ultimately leading to more effective and sustainable solutions.

Exploring students' attitudes towards research involves delving into various scholarly perspectives. Zan and Martino (2007) conceptualize attitudes as comprising emotions, beliefs, behavior, and their interactions with subjects, suggesting that the attitude towards research entails a comprehensive examination of individuals' thoughts, feelings, and behaviors concerning research endeavors. Attitudes can manifest as either positive or negative affect towards a particular subject, rooted in the evaluation process which distinguishes between threatening and nurturing environments (Cacioppo & Berntson, 1994). Moreover, a bi-dimensional understanding of attitude incorporates beliefs about the subject, as evidenced by Patak and Naim (2012), who observed that students' attitudes towards research encompass a spectrum of basic skills, from literature search and evaluation to paraphrasing and citation practices. Additionally, as

emphasized by Papanastasiou (2005), identifying and fostering positive attitudes towards research among students is crucial for facilitating their learning experiences. By cultivating a positive attitude towards research, educators can enhance students' engagement and proficiency in research practices, ultimately promoting their academic success and lifelong learning endeavors.

The primary goal of the study is to assess the attitudes of criminology students towards research through the utilization of Exploratory Factor Analysis (EFA). Exploratory Factor Analysis is a statistical technique commonly employed in research to uncover the underlying structure of a set of variables (Williams, Onsmann, & Brown, 2010). In this context, it aims to identify the key factors or dimensions that underlie the attitudes of criminology students towards research, thus providing insight into their perceptions, beliefs, and behaviors related to research activities within their field of study. EFA allows researchers to explore patterns of correlations among variables and group them into factors or dimensions based on their shared variance (Bandalos & Finney, 2018). By applying EFA to data collected on criminology students' attitudes towards research, researchers can identify common themes or constructs that influence how these students perceive and engage with research tasks and methodologies. This analysis can reveal the underlying structure of attitudes towards research within the criminology student population, shedding light on factors such as enthusiasm, confidence, perceived importance, and perceived difficulty associated with research activities (Fabrigar & Wegener, 2011; Howard, 2016).

2. Method

2.1 Study Participants

The research involved criminology students enrolled at the University of Mindanao. By specifically targeting this demographic, the researcher sought insights directly applicable to their field of study and educational journey. Before administering the main survey, an initial evaluation was conducted through interviews with 50 criminology students to gauge their attitudes towards the research topics. Subsequently, 245 criminology students were chosen using a simple random sampling method, ensuring each student had an equal chance of inclusion, thereby enhancing the sample's representativeness. This sample size was considered adequate for conducting Exploratory Factor Analysis (EFA) to explore the underlying dimensions of learning strategies.

Utilizing the data gathered from the primary survey, the researcher intended to perform an Exploratory Factor Analysis. EFA is a statistical method employed to identify latent factors or dimensions explaining the correlations among observed variables. Through analyzing response patterns to survey inquiries, EFA enables researcher to discern and interpret hidden factors reflecting various aspects of learning strategies in the domain of engineering mathematics. The goal is to unveil the inherent structure of criminology students' attitudes towards research, offering valuable insights for educational interventions and curriculum enhancement.

2.2 Materials and Instruments

This research was founded on a comprehensive examination of existing literature and theories concerning students' attitudes towards research. These scholarly sources provided the basis for formulating item statements related to research attitudes. Interviews were conducted with 50 criminology students to investigate their perspectives on research. Audio recordings were consistently employed to ensure precise transcription of the interviews (Creswell, 2013). The information derived from both the participants' input and the literature review played a crucial role in crafting the item statements, resulting in the creation of the Item Pool Statements for subsequent analysis. The survey questionnaire also employed a 5-point Likert Scale, as indicated below:

Scale	Description	Descriptive Interpretation
5	Strongly Agree	The item described means that the respondent strongly agrees to the given statement.
4	Agree	The item described means that the respondent agrees to a certain extent to the given statement.
3	Neither Agrees or Disagree	The item described means that the respondent neither agrees nor disagrees with the given statement.
2	Disagree	The item described means that the respondent disagrees to a certain extent to the given statement.
1	Strong Disagree	The item described means that the respondent strongly disagrees with the given statement.

2.3 Design and Procedure

This study employs a quantitative research framework to investigate the underlying determinants influencing students' attitudes towards research. To initiate this inquiry, the researcher conducted an extensive review of existing literature on research attitudes, utilizing it as a foundational scaffold for the study. By anchoring the investigation in established theories, the researcher aimed to ensure a comprehensive exploration and understanding of the theoretical premises guiding the research. These theoretical foundations provided the basis for formulating the item statements utilized in the study. Adhering to ethical guidelines, the researcher engaged with 50 criminology students to collect insights into their attitudes towards research. Participation in the study was voluntary, with participants afforded the freedom to decline involvement without facing any repercussions. Measures were implemented to uphold confidentiality, safeguarding respondents' information, including personal identifiers such as names, ages, and program affiliations. Informed consent was obtained from all participants, ensuring they were fully informed about the study's objectives and their rights as participants.

The salient findings derived from both the responses of research participants and the literature review served as the groundwork for developing the item statements constituting the Item Pool. Through Exploratory Factor Analysis (EFA), the researcher aimed to elucidate various aspects of attitudes towards research. EFA facilitated a comprehensive exploration of the data, revealing patterns, associations, and latent constructs contributing to students' perspectives on research.

Moreover, the research paper upholds stringent standards of academic integrity and ethical conduct. It stands as an original work, devoid of any instances of plagiarism or fabrication. Clear protocols on authorship attribution ensure that credit is accorded solely to those who made substantial contributions to the research process, encompassing conception, design, data analysis, interpretation, drafting, and critical revision of the article. This approach fosters accountability and acknowledgement for individuals who significantly contribute to the scholarly endeavor. Lastly, the study maintains transparency regarding potential conflicts of interest, affirming that the researcher's institution has no involvement in the study. This declaration underscores the integrity and impartiality of the research process.

3. Results and Discussion

Table 1 showcases the outcomes of the assessment conducted to ascertain the adequacy and appropriateness of the sample for exploratory factor analysis (EFA). The Kaiser-Meyer-Olkin (KMO) measure, gauging sampling adequacy, yielded a robust value of 0.951. This figure surpasses the widely acknowledged threshold of 0.5, affirming the data's high suitability for EFA. Per Kaiser's standards (1974), such a lofty KMO value signifies the dataset's aptness for identifying distinct factors.

Furthermore, Bartlett's sphericity test was utilized to discern whether the correlation matrix (R-matrix) significantly deviates from an identity matrix. The findings of this examination unveiled statistical significance ($p < 0.01$), denoting that the variables within the dataset are interrelated and manifest patterned associations. This bolsters the understanding that the dataset harbors meaningful interrelationships among variables, rendering it amenable to factor analysis.

Table 1: Sampling Adequacy and Multidimensionality tests for Attitude of Criminology Students in Research

Test	Value
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.951
Bartlett's Test of Sphericity	Approx. Chi-Square
	df
	Sig.
	4877.461
	780
	<0.001

Figure 1 depicts the scree plot derived from the secondary Exploratory Factor Analysis (EFA) undertaken within this investigation. As delineated by Cattell (1966), the scree plot employs eigenvalues extracted from either the input or condensed correlation matrix. The plot itself manifests as a visual representation where eigenvalues are charted on the vertical axis, while factors are delineated along the horizontal axis. Through visual examination of the plot, analysts can identify the juncture at which there is a notable decline in eigenvalue magnitude, often termed the "elbow" of the plot. The scree plot serves as a valuable instrument for discerning the number of significant factors derived from the data and the variance explicated by each factor. Specifically, analysts seek the point on the plot where the trajectory of the line connecting the plotted eigenvalues

changes abruptly, indicating a marked reduction in eigenvalue magnitude. This juncture indicates the number of factors deemed meaningful for further analysis. In the context of the presented scree plot, it is evident that the instrument under scrutiny exhibits a multi-dimensional framework. This observation is substantiated by the conspicuous decline in the plotted line subsequent to the third factor. As emphasized by Gorsuch (1997), the efficacy of the scree test is contingent on specific conditions, particularly the presence of a sizable sample size and well-defined underlying factors within the data.

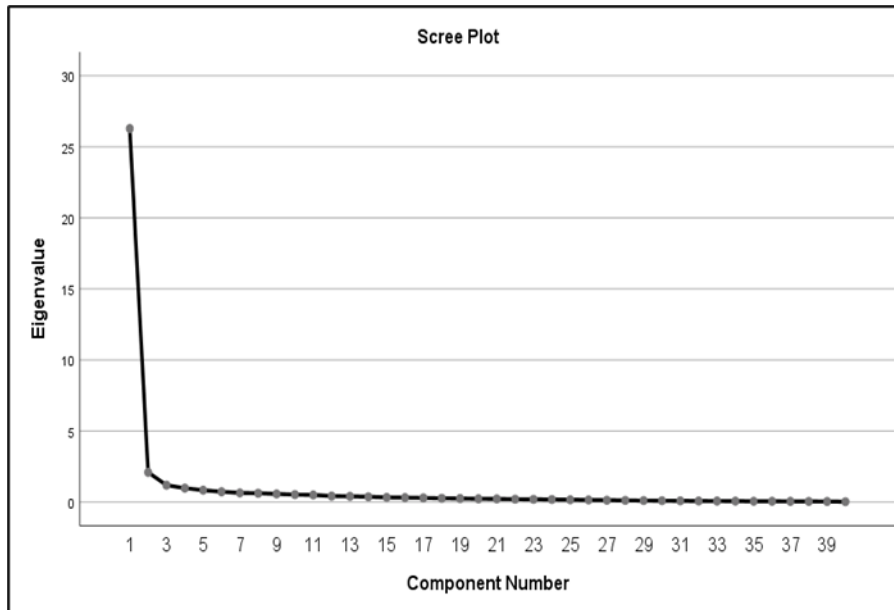


Figure 1: Scree Plot of Attitude of Criminology Students Towards Research

3.1 Rotated Component Matrix

In Table 2, the researcher presents the factor loading of the attitude of the students towards research. Following the exploratory factor analysis, the researcher identified a set of 29 items. To ensure the reliability of our analysis, we systematically removed any items with factor loadings below 0.4, consistent with the rigorous criteria established by previous studies (Romero & Gono Jr, 2021; Jr & Abalos, n.d; Costello & Osborne, 2005). Additionally, the researcher eliminated any factors with fewer than three-item statements, as recommended by MacCallum *et al.* (1999) and Raubenheimer (2004). As a result, the researcher identified three distinct factors that characterize the strategies utilized in learning mathematics among engineering students.

Table 2: Factor Loading of the Attitude of the Students Towards Research

Item Statement	Factor 1	Factor 2	Factor 3
Research has practical applications in various fields.	0.752		
I believe research contributes to evidence-based decision-making.	0.736		
Research enhances my ability to evaluate information critically.	0.733		
Research methods courses are beneficial for developing research skills.	0.719		
Research ethics are important considerations in conducting research.	0.718		
Research fosters creativity and innovation.	0.692		
Research helps to address societal challenges and issues.	0.679		
Research projects enhance my problem-solving abilities.	0.677		
Research experiences help me develop professional networks.	0.672		
Research allows me to explore my interests in depth.	0.65		
Research is a challenging but rewarding endeavor.	0.629		
Research allows me to contribute to knowledge creation.	0.626		
Research helps me to stay informed about current issues.	0.62		
Research fosters a deeper appreciation for the scientific method.	0.614		
Research experiences have helped me to develop transferable skills.	0.605		
I am interested in pursuing a career involving research.		0.806	
I am confident in my ability to analyze and interpret research data.		0.765	
I feel motivated to pursue research opportunities.		0.749	
I feel confident in my ability to conduct research.		0.743	
I believe research should be an integral part of the educational curriculum.		0.723	
I find the research process exciting and fulfilling.		0.681	
I enjoy participating in research activities.		0.659	
Research experiences have positively impacted my career goals.		0.628	
I feel supported by my institution in pursuing research opportunities.		0.62	
Research enhances my understanding of research methodologies.		0.618	
Engaging in research enhances critical thinking abilities.			0.762
I believe research is essential for advancing knowledge.			0.733
Research helps me to better understand complex topics.			0.717
Research is a valuable skill for academic and professional success.			0.713

The first factor was the *research application for education and career* (Table 3). Students' attitudes towards research, as revealed through the provided themes and item statements, demonstrate a multifaceted perspective encompassing various dimensions of research engagement (Gasiewski *et al.*, 2012; Pierce, Stacey & Barkatsas, 2007). Students recognize the practical applications of research across different fields, acknowledging its role in informing evidence-based decision-making and contributing to advancements in their chosen domains (Baba & HakemZadeh, 2012; Schildkamp, 2019). Moreover, they value research for its capacity to enhance critical evaluation skills and problem-solving abilities, indicating recognition of its role in fostering intellectual growth and knowledge acquisition (Biesta, 2007). Ethical considerations in research are also emphasized, with students expressing a commitment to conducting research responsibly and upholding integrity in the research process (Akaranga & Makau, 2016). Additionally, students perceive research as a means to address societal challenges and drive innovation,

highlighting its broader impact on social progress (Greenwood & Levin, 2006). Furthermore, they appreciate the personal and professional development opportunities afforded by research experiences, including skill development and networking opportunities (Hunter, Laursen & Seymour, 2007; Kneale *et al.*, 2016).

Table 3: Factor 1- Research Application for Education and Career

Item Statement	r-value
Research has practical applications in various fields.	0.752
I believe research contributes to evidence-based decision-making.	0.736
Research enhances my ability to evaluate information critically.	0.733
Research methods courses are beneficial for developing research skills.	0.719
Research ethics are important considerations in conducting research.	0.718
Research fosters creativity and innovation.	0.692
Research helps to address societal challenges and issues.	0.679
Research projects enhance my problem-solving abilities.	0.677
Research experiences help me develop professional networks.	0.672
Research allows me to explore my interests in depth.	0.650
Research is a challenging but rewarding endeavor.	0.629
Research allows me to contribute to knowledge creation.	0.626
Research helps me to stay informed about current issues.	0.620
Research fosters a deeper appreciation for the scientific method.	0.614
Research experiences have helped me to develop transferable skills.	0.605

The second factor is *personal engagement and development* (Table 4). Many students express a genuine interest in pursuing a career involving research, indicating a strong personal inclination towards engaging in scholarly inquiry (Hunter, Laursen & Seymour, 2007; Osborne, Simon & Collins, 2003). This reflects a proactive attitude towards research and suggests a willingness to invest time and effort into research-related activities. Additionally, students demonstrate confidence in their abilities to analyze and interpret research data, highlighting a sense of self-assurance in their research skills and competencies (Allison *et al.*, 2016).

Table 4: Factor 2- Personal Engagement and Development

Item Statement	r-value
I am interested in pursuing a career involving research.	0.806
I am confident in my ability to analyze and interpret research data.	0.765
I feel motivated to pursue research opportunities.	0.749
I feel confident in my ability to conduct research.	0.743
I believe research should be an integral part of the educational curriculum.	0.723
I find the research process exciting and fulfilling.	0.681
I enjoy participating in research activities.	0.659
Research experiences have positively impacted my career goals.	0.628
I feel supported by my institution in pursuing research opportunities.	0.620
Research enhances my understanding of research methodologies.	0.618

Moreover, students express motivation to pursue research opportunities, indicating an intrinsic drive to engage in scholarly endeavors. This motivation is further reinforced by

their confidence in conducting research, suggesting a belief in their capacity to undertake research tasks effectively (Pajares, 2012). Students also advocate for the integration of research into the educational curriculum, emphasizing the importance of research skills development within academic settings. Students find the research process exciting and fulfilling, indicating a positive emotional connection to research activities. This enjoyment of research participation underscores a sense of fulfillment derived from scholarly inquiry and suggests a potential source of intrinsic motivation for continued engagement in research endeavors (Fong, Zaleski, & Leach, 2015). Additionally, students attribute positive impacts on their career goals to research experiences, indicating recognition of the value of research in shaping their professional trajectories. Students feel supported by their institutions in pursuing research opportunities, indicating a conducive environment for research engagement. This institutional support is crucial for fostering a positive research culture and encouraging students to actively participate in research activities (Tsui, 2002).

The third theme is the *personal advancement* (Table 5). Students acknowledge that engaging in research enhances critical thinking abilities, indicating a recognition of the cognitive benefits associated with scholarly inquiry. This suggests an understanding of the value of research beyond the mere acquisition of knowledge, highlighting the importance of analytical skills development in the research process (Bean & Melzer, 2021). Moreover, students express a belief in the essential role of research in advancing knowledge, underscoring a broader appreciation for the significance of research in academic and intellectual pursuits (Vescio, Ross, & Adams, 2008; Moon, 2007). This recognition of research as a fundamental driver of knowledge generation reflects a deeper understanding of its transformative potential in shaping scholarly discourse and contributing to the collective body of knowledge (Bang & Vossoughi, 2016).

Table 5: Factor 3- Personal Advancement

Item Statement	r-value
Engaging in research enhances critical thinking abilities.	0.762
I believe research is essential for advancing knowledge.	0.733
Research helps me to better understand complex topics.	0.717
Research is a valuable skill for academic and professional success.	0.713

Furthermore, students perceive research as a means to better understand complex topics, indicating an awareness of its role in facilitating deeper insights and comprehension of intricate subject matter. This recognition of research as a tool for knowledge acquisition and synthesis suggests a pragmatic approach towards utilizing research as a means of intellectual growth and advancement (Bulterman-Bos, 2017; Fleming, 2024). Students view research as a valuable skill for academic and professional success, highlighting its importance in both educational and career contexts. This acknowledgement of research skills as essential for achieving academic excellence and career advancement underscores a pragmatic attitude towards research, recognizing its instrumental role in personal and professional development (Dadkhah, Lagzian & Santoro, 2019).

3.2 Latent Roots Criterion of the Extracted Factors

Shown in Table 3 is the latent roots criterion of the extracted factors depicting the percentage of Variance. The first factor has an initial eigenvalue of 26.282 and a variance of 65.705%. The second factor has an initial eigenvalue of 2.097 and a variance of 5.241%. The third factor has an initial eigenvalue of 1.188 and a variance of 2.97%. Overall the factors explain 73.916 percent of the attitude of criminology students towards research.

Table 6: Latent Roots Criterion of the Extracted Factors

	Eigenvalues	% Variance	Cumulative Variance
Factor 1	26.282	65.705	65.705
Factor 2	2.097	5.241	70.947
Factor 3	1.188	2.97	73.916

4. Conclusion

The Exploratory Factor Analysis has revealed three fundamental attitudes towards research among criminology students: Research Application for Education and Career, Personal Engagement and Development, and Personal Advancement. These findings hold significant implications for teaching research in academic settings. Understanding these attitudes allows educators to tailor their teaching approaches to better meet the needs and interests of students. For instance, emphasizing the practical applications of research in education and career advancement can motivate students by demonstrating the real-world relevance of research skills.

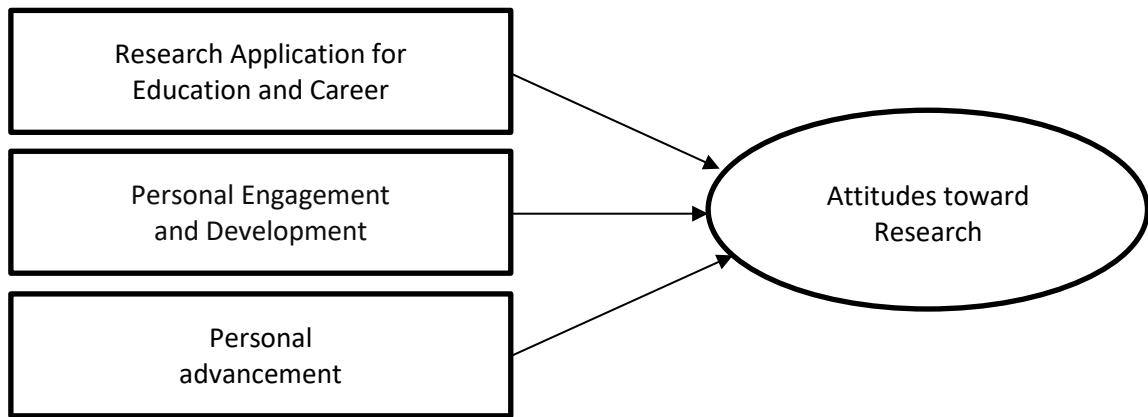


Figure 2: Dimensions of the Attitude of Criminology Students Towards Research

Moreover, fostering personal engagement and development through research activities can enhance students' intrinsic motivation and sense of fulfillment, thereby promoting active participation and deeper learning experiences. Additionally, recognizing research as a tool for personal advancement underscores the importance of integrating research skills into the curriculum to equip students with essential competencies for academic and professional success. By incorporating hands-on research experiences and providing opportunities for students to explore their interests and

develop critical thinking abilities, educators can cultivate a research-oriented mindset among students and empower them to contribute meaningfully to their fields of study.

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I have no personal, financial, or other interest that could or could be seen to, influence the decisions or actions we are taking or the advice we are giving during my research for this.

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