Investigating the Factors That are Associated With Teachers' Intentions to Utilize Research in Remote Areas of Greece

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Teachers around the world, serving in remote areas experience professional isolation (Bouck, 2004). In addition to being geographically isolated, challenges to remote teaching include a lack of professional support (Ralph, 2002) and experience of social isolation. Yet, the utilization of educational research has the potential to alleviate this issue. Therefore, this study examines the interplay between the factors that can possibly explain the teacher's intentions to use research for professional development purposes in remote schools in Greece. Based on the results of the Structural Equation Model that was examined, research attitudes had the strongest direct relationship to intending to use research for professional development purposes, although research skills also played a major role (directly, and indirectly) in this relationship.

Keywords: educational research, professional development, remote schools, educational inequality, teacher training, attitudes toward research

INTRODUCTION

Education in remote areas is a worldwide issue (Chunling, 2011) especially since remote areas are home to 46% of the worldwide population, and to 23% of the European population. However, serious educational inequalities exist between remote and urban schools (Lingam and Lingam, 2013), which have serious long-term social and economic consequences (Braun et al., 2006).

One of the main educational inequalities that teachers in remote areas face is that of their professional development. Since it is not always easy to travel long distances to attend professional development workshops and presentations (Kelly and Fogarty, 2015), remote teachers miss out on many of the training and other opportunities that are available to teachers in other settings. In turn, this disadvantage leads to serious inequalities since research has consistently shown that effective professional development is strongly linked to improved student outcomes (Smith and Gillespie, 2007; Hattie, 2009) and that it plays a major role in the success of high-performing, high-needs remote schools (Barley and Beesley, 2007). However, very little is known about the factors that are associated with teacher professional development in remote regions, beyond their geographical isolation (Arnold et al., 2005; Glover et al., 2016).

Some research studies have recognized the need for specialized teacher education in remote contexts (Ajayi, 2014; Hudson and Hudson, 2008). Yet the implementation of such programs by universities has been uncoordinated, random, or limited (Sharplin, 2002; White and Reid, 2008). In addition, professional education programs for in-service teachers have all too often been under-theorised and therefore have proved inadequate (Reid et al., 2010).

Despite these obstacles, however, the utilization of research has the potential to alleviate the isolation of teachers in remote areas regarding their professional development. Therefore, this study
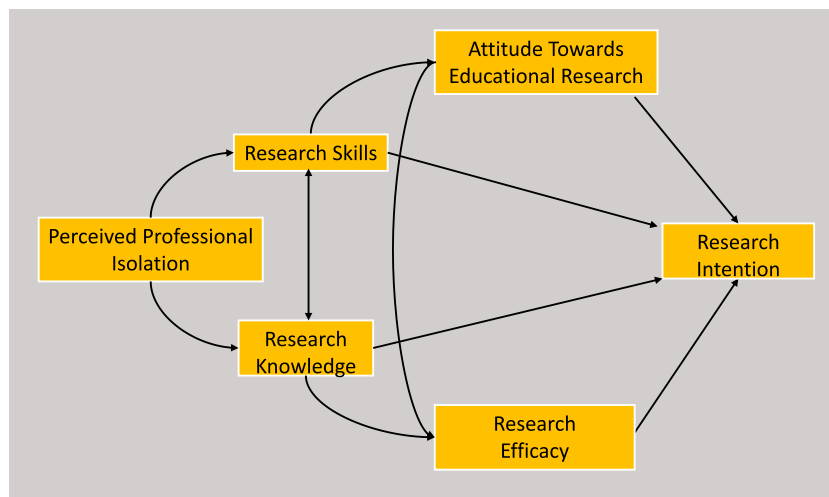
FIGURE 1 | Theoretical model.

examines the interplay between research skills, knowledge, efficacy, and attitudes, concerning teacher's intentions to use research for professional development purposes in remote schools in Greece. Within the Greek context, the research questions of this study are:

1. To what extent are research attitudes, research efficacy, and the perceived professional isolation of remote educators related to their intention to integrate action research into their daily practice?
2. What is the interrelationship between research knowledge, research skills, and research attitudes for teachers in remote schools in Greece?
3. What are the characteristics of remote educators who make the most of educational research in their profession?

Literature Review

The definition of remote regions in Greece is a bit complex due to the country's particular geographical characteristics. The extent of the Greek mountainous communities accounts for 77.9% of the country, making Greece among the most mountainous countries of the European Union (NORDREGIO, 2004). Moreover, the majority (63%) of the population in these areas of Greece live in problematic areas that are severely underdeveloped (European Commission, 2008), have high poverty rates, low levels of education, and lack of access to social services (Eurostat, 2003). This is in addition to the population that lives in remote islands in Greece which corresponds to 22% of the Greek population (United Nations, 2014).

Remote schools cannot be considered akin to non-remote schools. The education offered in these schools is impacted by many variables such as school poverty. Research reveals that students in remote schools face many personal and educational hardships–from living in poverty to having less opportunity and sophistication in technology. Additionally, school variables, such as school size and school location, matter. School size and

location impact many areas of education, including the characteristics of the school, curriculum, and post-school outcomes. Remote schools also have fewer course offerings (Bouck, 2004) and are poorly resourced, exhibiting a minimum standard in school resources (Hungi et al., 2017a). They lack a wide range of physical facilities, equipment, teaching, and learning resources (Lingam and Lingam, 2013). However, the link between the availability of reasonable quality facilities and resources on the one hand, and student learning experiences on the other, is very strong (UNESCO, 2008). Therefore, these deficiencies have a negative impact on how and what children learn (Thomson, 2002; Welch et al., 2007).

The educational inequalities between remote and urban schools create the remote–urban gap which is a troubling social issue. Although there is general agreement on the seriousness of this gap, there is no consensus on its causes or solutions (Fram et al., 2007). Therefore, research reveals that it grows even bigger especially in middle-income countries (Ibourk and Amaghouss, 2012). From an economic perspective, the level of education and its distribution within the population plays a crucial role. It regulates the income distribution and consequently the economic growth. If education is not equally distributed among the population, a large part of the income will be owned by a well-educated minority. This status will raise inequalities in the distribution of incomes, which in turn will cause more poverty (Wang, 1998). For all these reasons educational equity between schools is a subject of national priority (Bouck, 2004) in many countries.

Professional development is another major issue for teachers in remote schools. Their need for professional development increases "substantially" in relevance to the distance from metropolitan and provincial cities (Panizzon and Pegg, 2007). The professional journeys of remote teachers can be fraught with obstacles that their urban counterparts do not have to contend (Warren et al., 2012). Moreover, research has reported feelings of geographical isolation, professional isolation, and social isolation
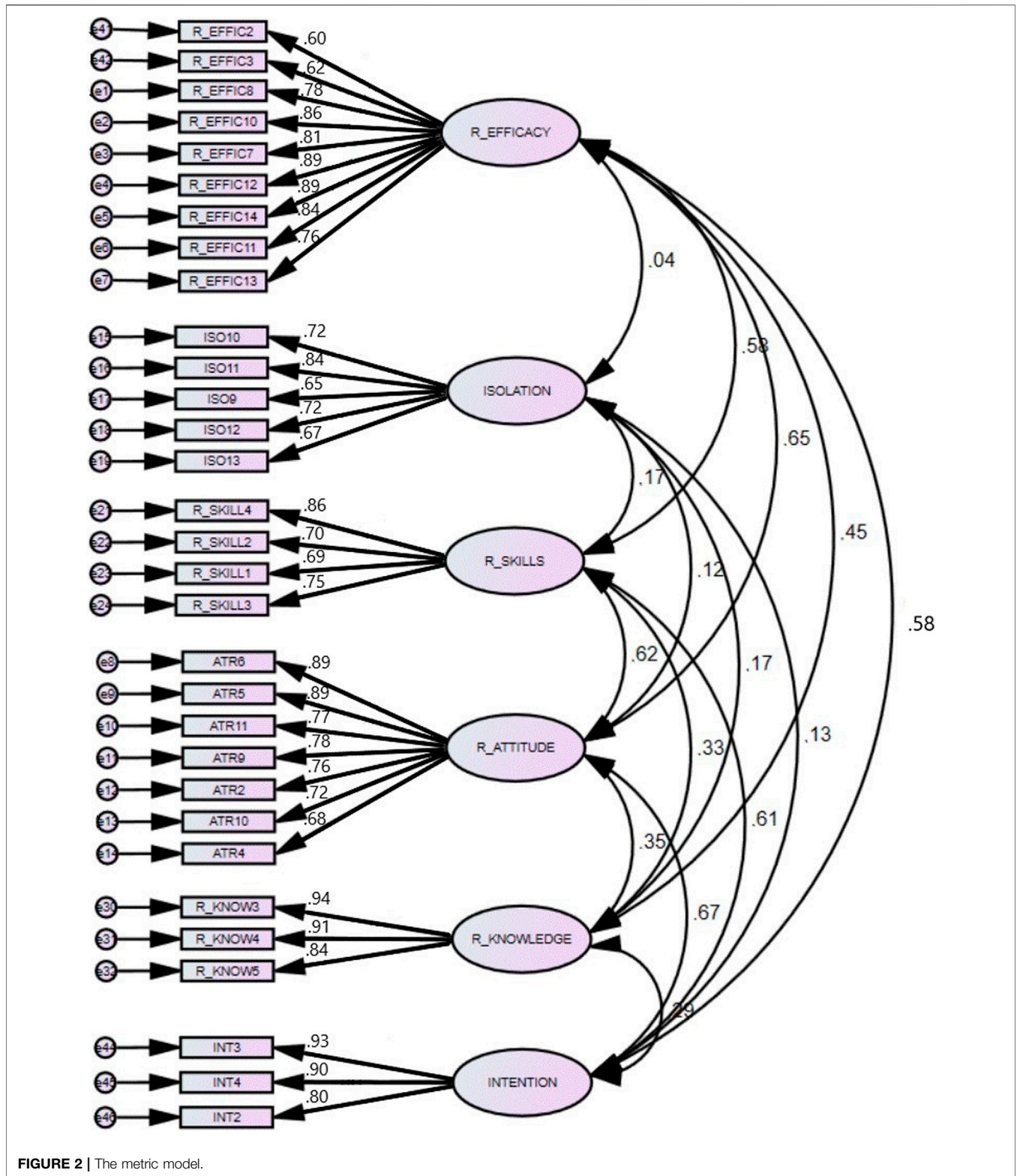
FIGURE 2 | The metric model.

for such teachers (Hellsten et al., 2011). Because of this, teachers in remote schools are six times as likely to report high staff turnover compared to their metropolitan colleagues (Panizzon and Pegg, 2007).

Physical distance has been identified as the major deterrent for teachers in remote settings (Hansen, 2009). It results in experiences of increased difficulties since a lot of professional development is provided centrally in the capital cities of each state

FIGURE 3 | Total estimates between variables (*$p < 0.001$).

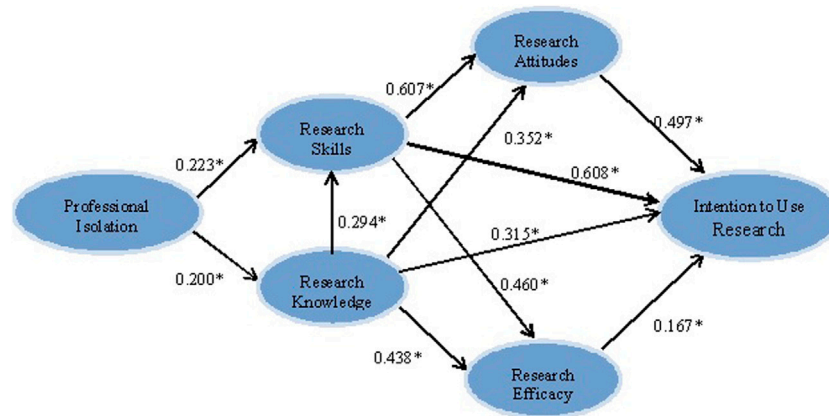following a "one size fits all" metro-centric model to teacher preparation. Yet this is inadequate for the needs of remote schools (White et al., 2011). Therefore teachers are required to travel for lengthy periods to get access to professional development, incurring extra traveling costs that are not always met by central budgets. Due to the geographic isolation of their remote location, teachers also find it difficult to continue with further tertiary studies and keep in touch with the latest teaching issues. This is because of the decreased opportunities to travel to the places that the examinations are held, or because of decreased contact and networking with teachers from other schools (Stokes et al., 1999).

In addition to being geographically isolated, challenges to remote teaching include a lack of professional support (Ralph, 2002) which inevitably results in teachers' professional isolation (Reid et al., 2010; Plunkett and Dyson, 2011). Such teachers have to deal with a lack of teaching resources, insufficient instructional materials (McCoy, 2006), as well as out-of-date classrooms and labs (Lynch, 2000; Marlow and Cooper, 2008). Teachers in remote areas also experience the limited availability of staff to support their PD efforts such as coaches, consultants, substitute teachers for teacher release time (Rude and Brewer, 2003; Hansen, 2009).

Moreover, teachers in remote spaces experience social isolation. They often teach multiple grades, or even multi-grade mixed-age classrooms (Barley, 2009), teach multiple subjects (Beesley et al., 2010), and wear many hats within the school (Minner et al., 2003). This may increase class size, planning time, and workload for them (Hellsten et al., 2011). Lack of facilities as the lack of Internet access and opportunities for socialization seems to make feelings of isolation even worse (Kelly and Fogarty, 2015). Such feelings have been intensified even further during the COVID-19 pandemic (Trikoilis and Papanastasiou, 2020).

Despite the obstacles that are faced by teachers in remote schools, educational research has the potential to enhance their professional development (Ritchie, 2006) without necessarily having to travel long distances to be trained by others. Educational research may offer different functionalities which could affect teachers' practice. First of all research can enable teachers to realize a critical, reflective attitude towards their own

practice (Hall, 2009). Secondly, research has the ability to provide teachers with the knowledge and evidence of what and why it works in practice (Ponte et al., 2004). Thirdly, it can foster the transformation of the scientific research results into improvements in classroom practice (Gore and Gitlin, 2004). To fulfill these aims, teachers need to develop sufficient research knowledge and skills, positive beliefs regarding research, and a positive attitude towards research (Linden et al., 2015).

Theoretical Framework

For the purposes of this study, the theoretical framework that is used is displayed in **Figure 1** and is based on a hybrid model. It consists of the Theory of Planned Behavior (TPB) (Ajzen, 1991) in conjunction with the theory of Knowledge, Attitude, and Behavior (KAB) (Allport, 1935). The Theory of Planned Behavior argues that intentions are related to factors that motivate and influence behavior. They are indications of the magnitude of the effort that people are planning to make to adopt this behavior (Ajzen, 1991). Intentions also depend on other factors, which can provide a useful model for predicting decisions about one's beliefs and motivations (Hung and Jeng, 2013). According to the Theory of Planned Behavior, the intention to act is determined by three main factors: 1) the individual's attitudes towards specific actions, 2) perceived control, and 3) the subjective norm. In this study, the first factor corresponds to teachers' Attitudes toward Research which includes one's beliefs about the usefulness of research, and their positive predisposition towards research.

Attitudes can be considered as one of the most important concepts in social psychology (Manstead and Hewstone, 1995), which have been used repeatedly to explain human behavior (Zimbardo et al., 1977). According to Fishbein and Ajzen (1975) attitudes are an important factor that is often used to understand and predict people's reaction to a subject or change, and how their behavior may be influenced (Fishbein and Ajzen, 1975). Attitudes constitute a state of readiness of the individual to respond to external stimuli that exert a strong and dynamic influence on cognitive functioning and behavior (Allport, 1935). They also include beliefs about the consequences that behavior can have (Ajzen, 2006). Positive attitudes contribute to progress towards

TABLE 1 | Reliability and validity of the metric model.

	CR	AVE	MSV	MaxR(H)	1	2	3	4	5	6
Research knowledge	0.926	0.807	0.205	0.937	**0.898**					
Research efficacy	0.936	0.624	0.417	0.971	0.453	**0.790**				
Research attitude	0.919	0.620	0.446	0.979	0.347	0.646	**0.787**			
Proffesional isolation	0.814	0.525	0.033	0.981	0.182	0.053	0.124	**0.724**		
Research skills	0.839	0.568	0.389	0.983	0.326	0.582	0.624	0.181	**0.754**	
Research intention	0.911	0.775	0.446	0.986	0.295	0.578	0.668	0.144	0.606	**0.880**

The bold values represent the square root of the AVE. Discriminant validity is confirmed since these values are higher than the correlation between the latent variables.

TABLE 2 | Factor correlation matrix.

	Proffesional isolation	Research knowledge	Research skills	Research efficacy	Research attitude
Research knowledge	0.200***	0.000	0.000	0.000	0.000
Research skills	0.223***	0.294***	0.000	0.000	0.000
Research efficacy	0.164***	0.438***	0.465***	0.000	0.000
Research attitude	0.171***	0.352***	0.607***	0.000	0.000
Research intention	0.163***	0.315***	0.608***	0.167***	0.497***

*** (***$p < 0.001$).

meeting one's goals, while negative attitudes might inhibit these goals. Finally, attitudes ultimately govern one's life by providing directions for managing people and situations (Butt and Shams, 2013).

Teachers' attitudes towards educational research are particularly important and are considered vital to success in any field (Butt and Shams, 2013). It is even argued that attitudes are more important than experience and academic preparation (Abraham, 2003). The findings of various studies have drawn attention to the importance of measuring teachers' attitudes (Yara, 2009), which is a priority because teachers are among the most important practitioners who apply educational theories (Ekiz, 2006; Gu and Wang, 2006; Smith, 2002). Attitudes have the potential to influence teachers' behavior (Richardson, 1996) and to influence the amount of effort they are willing to spend on learning educational research (Papanastasiou, 2005).

The second factor of the TPB corresponds to Perceived behavioral control. This is another parameter that reflects beliefs about individual's perceived ability to perform a behavior (Ajzen, 2006). This term is related to the Self Efficacy Theory - SET (Bandura, 1977). According to this theory, people who consider themselves highly effective behave, think, and feel different from those who perceive themselves as ineffective. The concept of self-sufficiency is related to the judgments a person makes about his or her ability to act in a particular task or circumstance. This perception varies with the period and the situation of the individual (Cervone and Pervin, 2001). Particularly in the case of education, great importance has been given to investigating teachers' self-sufficiency over the last 3 decades (Mahajna, 2014). Researchers have reported that teachers' self-efficacy is related to the desire to teach (Siwatu, 2011), to the level of professional burnout (Skaalvik and Skaalvik, 2010), to the quality of teaching (Raudenbush et al., 1992), commitment to teaching (Skaalvik and Skaalvik, 2010), satisfaction (Klassen and Chiu, 2010) and school climate (Chong et al., 2010). In addition, a person's attitudes toward

behavior and sense of self-efficacy can predict one's effort for that behavior (Lillian, 2012).

Subjective norm is an additional factor of the TPB which reflects the personal beliefs that are influenced by society's perception of the application of behavior (Azjen, 2006). That is to say, the individual accepts social pressure and is influenced by the opinion of important people in order to adopt a behavior (Fishbein and Ajzen, 1975). Friends, family, and coworkers are groups that may or may not influence behavior (Chua, 1980). In fact, people are more willing to perform or not to perform a behavior depending on the importance of the social pressure group (Ho et al., 2008). In this study Subjective norm is represented by the teachers' perceived professional isolation. This factor refers to the extent that the remote education community believes that the professional development of teachers is hampered by particular local parameters.

The impact of knowledge on a person's intention is examined through the Knowledge, Attitude, and Behavior theory (KAB). According to the KAB theory, knowledge and information can influence a person's attitudes towards a particular behavior and finally they can achieve a significant impact on the person's behavior (Chou, 2016). According to this theory, knowledge is necessary to make changes in the way individuals acquire knowledge and skills through learning (Liu et al., 2016). Thus, in the context of this study, the term Knowledge is conceptualized by Research Knowledge and Research Skills that have been obtained through teacher preparation courses. According to the KAB model, a teacher's knowledge and skills in research may influence their attitudes toward research which, in turn, may lead to the teacher's engagement in research. Finally, through the combination of these theories an interesting perspective is hypothesized: that Research Knowledge and Research Skills are likely to act as mediators, between Professional Isolation and Research Attitude, but also between Professional Isolation and Research Efficacy.

MATERIALS AND METHODS

The sample of this study consisted of 377 teachers from remote mountainous and island regions in Greece. These teachers came from 107 schools (56 primary and 51 secondary) that were randomly selected out of the 556 remote schools of Greece. This sample corresponds to 10.2% of the population of remote teachers in the country. Overall, 67.9% of the sample were female, and their average years of teaching were 14.9 years (SD = 8.3). In terms of highest level of education, 52.2% of the participants only earned a Bachelor's Degree, 44.6% had a Master's degree, and 3.2% had earned a Ph.D. in Education.

Six questionnaires were utilized in this study and all items were measured on a 7-point Likert scale (1 = strongly disagree, to 7 = strongly agree). Two of these questionnaires, the Revised Attitudes Toward Research Scale (R-ATR) (Papanastasiou, 2014; 2005), and The Research Self-efficacy Scale were derived from pre-existing scales while the remaining four were constructed by the researcher. The R-ATR was used to measure teacher attitudes toward research (Papanastasiou, 2014) and had an internal consistency of 0.91 in the current sample. Research self-efficacy was measured by the Research Self-efficacy Scale (Greeley et al., 1989) with an alpha level of 0.96. The intention for action research was measured by the Research Intention Scale (α = 0.91). The Professional Isolation Scale was used to measure professional isolation as perceived by remote teachers (α = 0.73). The Knowledge Research Scale was used as a measure for each individual's training in research courses and his/her involvement in research (α = 0.95). Finally, the Research Skills Scale was used to measure research practices and skills (α = 0.92).

A confirmatory factor analysis was run in AMOS 18 for the Revised Attitudes Toward Research Scale (R-ATR) and The Research Self-efficacy Scale. For the remaining four scales, an exploratory factor analysis had been conducted in SPSS 21 using the Maximum Likelihood extraction method. The Maximum Likelihood estimation was preferred to that of the generalized least squares estimation since it leads to less biased parameter estimates and more accurate fit indices (Olsson et al., 2000). The number of factors extracted was determined by the Eigenvalues and scree plots. The criteria used were eigenvalues greater than 1 as well as the natural breaks in the scree plots. The Oblimin rotation was used in the analysis in order to account for the fact that the underlying factors are most likely correlated with each other.

Moreover, for the purpose of this study, a measurement model consisting of the six scales has been constructed, as displayed in **Figure 2**, and a two-step approach to Structural equation modeling (SEM) was employed (Schumacker and Lomax, 2010). The first step of this procedure involved the estimation of the measurement model for all latent variables, while the second step involved the examination of the relationships among the latent variables. The fit indices that were used in the analysis were those of the chi-square (χ^2), the chi-square divided by the degrees of freedom (χ^2/df), the Normed Fit Index (NFI), the Tucker-Lewis Index (TLI), the Incremental Fit Index (IFI), the Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA).

RESULTS

The measurement model was assessed using confirmatory factor analysis (CFA) in AMOS v18. It consisted of 46 items that made the six constructs of the study operational. In order to obtain the good fit of the metric model to the theoretical, the following procedure was followed. Initially, items with a loading factor less than 0.50 and with a poor contribution to the theoretical conceptualization of the corresponding latent variable were removed. The errors of each variable were then examined and co-variations were created between those with the highest values (Hermida, 2015; Gaskin, 2016). After this procedure, each latent variable had to be identified by at least three observed items, characterized by Reliability, Convergence Validity, and Discrimination Validity.

In order to test the verification of Reliability, the Convergence Validation and the Discrimination Validation for this survey, three criteria were used: Composite Reliability (CR), the Average Extracted Variance (AVE), and Maximum Shared Variance (MSV). The first term is a measure of the reliability of internal consistency and consistency of elements of a structural variable. The allowed values for CR are at least 0.7. The second is a measure of reliability and validity of convergence and expresses the percentage of fluctuation of the structural variable due to variability of the observed variables. Accepted values for AVE are at least 0.5 (Fornell and Lacker, 1981). The third term refers to the maximum value of the dispersion that is shared between the observed variables, making it a criterion for the validity of the distinction. In order to ensure the validity of discrimination, the MSV should be less than AVE, while the square root of the AVE values are greater than the correlation coefficients of the model variables between each other (Hair et al., 2010). Finally, correlations of structural variables should be less than 0.9. All the above criteria were met (**Table 1**). Composite Reliability values are greater than the threshold of 0.7. Average Expected Variance has values are greater than the minimum of 0.5 (Fornell and Lacker, 1981). Finally, Maximum Shared Variance values are less than the AVE, and the square root of the AVE values are greater than the correlation coefficients between the variables (Hair et al., 2010).

After the estimation of the measurement model, the fit of the hypothesized structural model was examined. The structural model is superior to the measurement model since it can both explain the contribution of the measurable variables to the determination of the model (Byrne, 2001), as well as determine the adaptability of the model to the data (Loehlin, 1987). The results of this analysis revealed an excellent fit of the model based on the following indices: CMIN/DF = 2.212, RMSEA = 0.055, CFI = 0.990. TLI = 0.982, NFI = 0.991, and IFI = 0.995. The values of the indices indicate that the structural model adequately depicts the relationships between the variables and therefore this model can provide answers to the research questions of this study.

A closer look at the standardized path coefficients of the model, as displayed in **Figure 3**; **Table 2**, revealed the following: Teachers with higher levels of Professional Isolation surprisingly demonstrated higher levels of Intention to use Research. This is an indirect effect with a β-value of (0.163, p = 0.000). This

unexpected finding is supported by the fact that teachers who perceived themselves to have high levels of Professional Isolation were more likely to have higher levels of Research Skills ($\beta = 0.223$, $p = 0.000$) and Research Knowledge ($\beta = 0.200$, $p = 0.000$). In turn, teachers with more Research Knowledge reported having more Research Skills ($\beta = 0.294$, $p = 0.000$), higher levels of Research Efficacy ($\beta = 0.438$, $p = 0.000$), higher levels of Research Attitudes ($\beta = 0.352$, $p = 0.000$) and more Intention to use Research ($\beta = 0.315$, $p = 0.000$). This particular finding stresses out the significant role of Research Knowledge as a stimulator of teacher's research intention. Additionally, teachers reporting higher levels of Research Skills were more likely to have positive Attitudes Toward Research ($\beta = 0.607$, $p = 0.000$), higher levels of Research Efficacy ($\beta = 0.460$, $p = 0.000$) and Research Intention ($\beta = 0.608$, $p = 0.000$). This finding underlines the importance of skills gained during the research practice. Finally, teachers with higher levels of Research Attitudes and Research Efficacy reported higher levels of Intention to use research in their daily practice with β-values of ($\beta = 0.497$, $p = 0.000$) and ($\beta = 0.167$, $p = 0.000$) respectively. According to these results, Research Skills is the variable with the highest direct effect on teacher's intention to use research ($\beta = 0.608$, $p = 0.000$). Research Attitudes ($\beta = 0.497$, $p = 0.000$) and Research Knowledge ($\beta = 0.315$, $p = 0.000$) follow by lower β–values, whereas Research Efficacy has the lowest path coefficient ($\beta = 0.167$, $p = 0.000$).

Beyond the structural model, a series of ANOVAs were performed to investigate the characteristics of the teachers in the study who utilize educational research to the largest extent. However, not many differences were found in relation to their background variables. The only differences were among teacher qualifications, with teachers who held a Master's degree utilizing research to a larger extent compared to those who only held a BA ($\bar{x}_B = 3.9$, $\bar{x}_M = 4.5$, F = 7.77, $p = 0.000$). No additional differences were found for teachers holding a Ph.D.

Finally, a series of Spearman's rho Correlations were examined. Based on these correlations, it was found that the intention to utilize research is further associated with their frequency of reading research articles ($\rho = 0.54$, $p = 0.000$) and with their frequency of searching the literature for solving educational problems ($\rho = 0.51$, $p = 0.000$). Moreover, research intention was correlated with the organization of a research process ($\rho = 0.475$, $p = 0.000$), the identification of a research problem ($\rho = 0.464$, $p = 0.000$), the ability to conduct research ($\rho = 0.444$, $p = 0.000$), the application of educational research findings to solve problems ($\rho = 0.426$, $p = 0.000$), the communication with other researchers to exchange views on educational issues ($\rho = 0.420$, $p = 0.000$), the ability to help other researchers to conduct research ($\rho = 0.383$, $p = 0.000$), the completion of postgraduate research courses ($\rho = 0.334$, $p = 0.000$) and finally the completion of courses on the theoretical bases of postgraduate education ($\rho = 0.334$, $p = 0.000$).

DISCUSSION

From a theoretical perspective, the data for this study were able to support the fit of the hybrid model which combined the theories of Knowledge, Attitude, and Behavior (KAB) and the Theory of Planned Behavior (TPB). This is in accord with prior research that found that the ability of the TPB theory to collaborate with other theories has been established in a wide range of scientific fields (Hoeksma et al., 2017; Eccles et al., 2012). More specifically, in the current study, the analysis of the final model revealed that the Knowledge construct of the KAB theory can be interpreted by two parameters: Research Knowledge and Research Skills. These two parameters, on the one hand, were correlated to Attitudes toward Research according to the KAB theory whereas on the other hand they were implemented in the TPB model as mediators between Professional Isolation, Attitudes toward Research and Research Skills.

The results of this study also underlined the importance of the teacher's theoretical knowledge and research practice skills. Specifically, although Skills, Knowledge, Attitudes, and Research Efficacy were positively related to teacher's Intentions to use Research, Research Skills and Research Attitudes were the ones that had the largest effect on this Intention. These results underline the role of academic knowledge in shaping teacher's attitudes towards research, but far more emphasize the contribution of practical research skills. The findings are in line with other surveys which indicate that students who acquire theoretical and practical knowledge of research show an improvement in their research efficacy (Bishop and Bieschke, 1998; Tosun, 2014).

Beyond the theoretical perspective, an especially interesting finding of this study was that the teachers who perceived themselves as the most isolated professionally also had higher levels of Research Knowledge and Skills. This outcome could be explained by the John Henry Effect; So, it is likely that these teachers, who are aware that they are lagging behind in terms of their qualifications in relation to their colleagues in urban centers, might try especially hard to develop professionally on their own in order to meet the country's teacher evaluation criteria. It is no coincidence that 44.6% of the sample holds a Master's degree and 3.2% holds a Ph.D. in education.

In terms of teacher's characteristics, there was a difference in the intention of doing research between teachers holding a postgraduate degree and those who only hold a bachelor's degree. This result is also consistent with other prior research that has found that students in postgraduate education are more likely to have positive attitudes and utilize research to a larger extent compared to teachers with only bachelor degrees (Bishop and Bieschke, 1998; Holincheck and Galluzzo, 2012; Kurt, 2015). This is also consistent with prior studies that found that teachers who had taken research courses at both, the graduate and undergraduate level were more likely to read research articles compared to those who only took one research course at a single point in their educational training (Papanastasiou and Karagiorgi, 2019). For this reason, several educational institutions are re-examining the way they prepare their postgraduate students and redefining research requirements in postgraduate studies (Bishop and Bieschke, 1998; Metz, 2001; Eisenhart and DeHaan, 2005).

The results of this study raise several implications regarding the professional development of teachers in remote areas. In this friendly climate, teacher's professional experience can be used to

develop action research through successful and continuous collaborative practices (Chance and Segura, 2009). However, the inability to save time is one of the major barriers to teacher research involvement (Goswami and Rutherford, 2009; Peterson et al., 2010). Therefore at the service level, it is necessary to restructure the school schedule to make provision for time devoted to research activities, both by teachers and students. Redesigning teacher's responsibilities and hiring auxiliary staff at school could also save time and energy for engaging in educational research.

In addition, the problem of distance from urban centers and the sense of professional isolation of teachers in remote schools can be addressed by offering distance education research programs. According to the results of the analysis, there are mediators that mediate not only between Professional Isolation and Research Attitudes but also between Professional Isolation and Research Self-Efficacy. These mediators are Research Knowledge and Research Skills and can help shape educational training programs (seminars, webinars, and workshops) for remote in-service teachers. These programs need to place particular emphasis on the development of research skills in relation to theoretical knowledge, as the former are more strongly linked to the intention to do research, both directly and indirectly.

The findings of this study could also shed light to some implications both at undergraduate and graduate-level education. Keeping toward research is less influenced by theoretical knowledge of research and much more by research skills, a different orientation for the education of the future teacher-researchers should be defined. On this basis, the adoption of a practical perspective regarding teacher research training would allow teachers to undertake research more effectively (Papanastasiou and Karagiorgi, 2019). Therefore, academic institutions could focus on inducting new teachers early into the education research culture (Frager, 2010). This will help young researchers understand the importance of research from the beginning of their studies so that they can integrate into the learning community as independent and critical thinkers and researchers (Merkel, 2003). This practice could also reinforce student's interest in research, encouraging them to create their own research agenda in order to create new knowledge as well as preparing them for postgraduate programs (Adamsen et al., 2003). Undergraduate students can also participate in summer undergraduate research programs. These programs strengthen their self-confidence and increase their enthusiasm for scientific research (Brey et al., 2015).

Additionally, the research course syllabus for both undergraduate and postgraduate students could focus more on the development of skills which this study found to be highly correlated with the intention for research. These skills refer to the reading of research articles and searching the literature in order to solve educational problems. Other research-oriented skills are the organization of the research process, the identification of a research problem, and the ability to conduct research. The application of educational research findings to solve problems, the communication with

other researchers to exchange views on educational issues, the ability to help other researchers conduct research and the completion of postgraduate research courses were found to have strong correlations with the intention for research. Finally, as the results of this study show, teachers' intentions to do research can be further enhanced by courses on the theoretical foundations of education. These courses can provide the necessary background of knowledge they need in order to get familiar with the existing theories of the field and mobilize their own professional quest in research.

In conclusion, this study can provide useful information to universities and policymakers regarding teacher professional development. On the one hand, this study supports the potential of educational research for the purposes of the professional development of teachers in remote areas around the world. On the other hand, this study supports the importance of providing incentives to teachers in remote areas to obtain postgraduate degrees which could advance their research knowledge and help them develop more concrete research skills. This in turn could possibly have a positive impact on their research attitudes as well as on their research efficacy, which could be used in ways to improve the knowledge, skills, as well as their teaching practices, without passively expecting others to offer professional development opportunities to them.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Greek Board of the Institute of Educational Policy. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

Both authors have contributed to the concept and the design of the research project. The data collection, analysis and write-up was performed by DT, while the supervision and critical review was performed by EP. Both authors have reviewed, read and approved this manuscript for publication.

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