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ILKNUR EGINLI
*ISTANBUL MEDIPOL UNIVERSITY*, ilknur.eginli@gmail.com

Kenan Dikilitas
*University of Stavanger, Norway*, kenan.dikilitas@uis.no

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# Examining the Interplay Between English Language Teachers' Mindset and Researcher Self-Efficacy Beliefs in the Use of Action Research

Ilknur Eginli
*Istanbul Medipol University, Turkey*

Kenan Dikilitaş
*University of Stavanger, Norway*

**Abstract**

Action research offers teachers an empowering and transformative experience of professional engagement. Teachers engaging in action research are encouraged to develop their inquiry skills and to adopt a growth mindset in contrast to a fixed mindset. This study explored the complex relationship between teachers' researcher self-efficacy beliefs and growth mindset, hypothesizing that action research can impact. The participants of this study comprised 219 practicing English language teachers who had varying degrees of action research engagement during or after their graduate programs in English language teaching. The study used a quantitative research design employing two questionnaires. The findings show that while teachers' researcher efficacy beliefs increased dramatically with the increase in their action research involvement, there was no noticeable relationship between teachers' mindset and teacher-researcher self-efficacy beliefs. We draw critical implications for language teachers and provide recommendations for a sustainable engagement in action research, which could impact both self-efficacy and mindset.

***Keywords:*** teachers' mindset, action research, teacher-researcher self-efficacy beliefs, professional development

## Introduction

It is more likely that the profession of teaching can evolve when there is change and transformation in teachers' professional lives. Bandura's (1997) theory of self-efficacy and Dweck's (1999) mindset theory, also known as "self-theory," are closely related to each other in that both offer a theoretical basis for the cognitive underpinnings of the practical, experiential development of practitioners. Both theories also rely on the key role of individuals' intrinsic beliefs (Bandura, 1995), which can interact in a complex way for teacher development. When teachers employ the right mindset in conducting research, transformation is sure to occur (Borg, 2010). More than half a century ago, Corey (1953) described action research as research done by an educator on the premise of becoming an effective practitioner who can make better decisions and engage in better actions. With this in mind, we examine the role of action research engagement in empowering and transforming teachers' research self-efficacy beliefs, which in turn cultivates a growth mindset. Some have argued that teachers adopt a growth mindset in contrast to fixed mindset through such inquiry and research-driven professional development. However, to date, there is little empirical evidence that corroborates this idea. It is such evidence that this study seeks regarding the complex interaction of teachers' research self-efficacy beliefs and growth mindset, which action research can impact.

## Mindset and Mindset for Language Teachers

Mindsets, also known as implicit theories, are sets of self-beliefs regarding how people think about the nature of intelligence and personality (Dweck, 2000; Dweck & Leggett, 1988). Dweck (2006) defines "mindset" as individuals' way of thinking about their talent and ability and acting accordingly. Since this is very much related to achievement goal theory and attribution theory under the larger umbrella of motivational theories (Weiner, 2010; Dweck, 2012), the mindsets of teachers may be explained via an understanding of their behavior in anxiety and failure (Reich & Arkin, 2006), their underlying desire in making progress and accepting challenges (Le Fevre, 2014), and their actions in professional development (Thadani et. al., 2010). Dweck (2006) asserts that since individuals' mindsets are shaped by experiences and their beliefs about achievements and failures in life, once individuals set a certain belief system about what they can do, then they act on their beliefs. Thus, their attitudes toward life experiences can shape individuals' mindsets. Dweck (2000, 2006) has also shown that some people regard their abilities, skills, and intelligence as being innate, while others see them as learned traits. These two distinct approaches developed by Dweck are called "growth mindset" and "fixed mindset." In educational settings, Yeager and Dweck (2012) specialized in running interventions for changing students' mindsets, and they specifically highlighted the importance of two kinds of implicit theories relevant to education: implicit theories of intelligence and implicit theories of personality. Any individual student varies in their implicit theories: some have a more fixed or innate theory, whereas others have a more malleable or incremental theory. That is, one sees intellectual ability as something of which people have a fixed, unchangeable amount, and the other one views an ability as grown or developed over time.

According to Dweck (2008), it is essential to create a classroom environment that is based on a growth mindset to get the best out of students. In the field of education, not surprisingly, many studies have investigated the relationship between students with a growth mindset and their performance in academic

settings (Duckworth & Quinn, 2009; Dweck, 2008; Saunders, 2013). It is lamentable that there is a dearth of research investigating teachers with a growth mindset (Seaton, 2018) and how such a mindset is nurtured in teachers' professional development, particularly in the context of English language teachers. The results of examining the relationship between students' growth mindset and self-efficacy highlight the impact of a growth mindset on students' academic performance, and in return, high academic performance leads to high self-efficacy beliefs (Burns & Isbell, 2007; Clark & Sousa, 2018; Zander et al., 2018). Since the growth mindset is malleable (Dweck, 2006; Ramsden et al., 2011), it can be increased by persons working on its improvement through effort and high motivation. The literature has not addressed what sort of potential changes may occur in teachers' growth mindset when they are motivated to grow professionally by being more involved in research. Additionally, there is a need to fill a void in the literature regarding the effects of teachers' high self-efficacy beliefs on their action research practices and whether conducting action research has a direct or indirect effect on teachers' mindsets. Individuals with a growth mindset are more likely to develop high self-efficacy beliefs, while those with a fixed mindset are more likely to develop low self-efficacy beliefs (Gero, 2013; Williams, 2012; Wood & Bandura, 1989). And, again, while the literature provides extensive studies investigating the effect of mindset on students' learning and motivation, little empirical data exists regarding teachers' mindset, especially language teachers' mindset and its relationship/impact on teacher-researcher self-efficacy beliefs.

## Self-Efficacy Beliefs Through Action Research

Action research has been one of the key professional development activities that might empower teachers (Dikilitaş et al., 2019), cultivate new and changing identities (Edwards & Burns, 2016b; Yuan & Burns, 2017), boost their self-efficacy (Wyatt & Dikilitaş, 2016), and grant them autonomy in researching and teaching (Wang & Zhang, 2014). Although the impact on these many dimensions has been investigated, the potential impact on teacher mindset in relation to self-efficacy development has yet to be explored, which this study aims to address with a quantitative research design. Action research is often seen as a professional development practice, activity, tool, or strategy that aims to enable teachers to learn through researching issues of interest, curiosity, need, or challenge in their teaching (Dikilitaş & Griffiths, 2017). Teachers undertaking such an investigative process might gain new insights into, develop awareness of, and build new skills for teaching in more contextually appropriate ways (Dikilitaş & Yaylı, 2018) based on the evidence or data they generate. The reflection becomes transformative and critical when enacted through the action research engagement (West & Crookes, 2017). Research results often inform what to do next, while the process of planning and conducting research cultivates the teaching development process. Action research helps teachers to improve their teaching and critically unpack and question their beliefs about their teaching practices to transform their mindset (Lambirth et al., 2019). In addition, action research nurtures teachers' analytic problem-solving (Darling-Hammond, 2012), a "problem-solving mindset" (Borg, 2010, p. 403) to problematize practical challenges, reconstructing new identity (Dikilitaş & Yaylı, 2018; Yuan & Burns, 2017), improving inquiry skills (Dikilitaş & Çomoğlu, 2022), and supporting critical thinking for exploring and analyzing one's teaching (Davis et al., 2018).

Action research as a professional development process could strengthen and cultivate teachers' self-efficacy beliefs (Henson, 2001; Wyatt, 2008; Wyatt & Dikilitaş, 2016). However, there is a dearth of empirical research that reports links between action or teacher research engagement and the development of self-efficacy beliefs (Wyatt & Dikilitaş, 2016). Henson (2001) concludes that the participating teachers who conducted collaborative action research during an academic year self-reported efficacy gains in teaching. Similarly, Wyatt (2008) reports in his multi-case qualitative research with five English language teachers in Oman that a continuous professional development course based on reflective engagement that lasted 15 months helped them develop their self-efficacy beliefs about instructional tasks such as employing group work to help low-achieving learners, analyzing and adapting course materials, monitoring learning, and evaluating learning outcomes. In their case study with three Turkish teachers who engaged in research for continuing professional development, Wyatt and Dikilitaş (2016) found that the teachers experienced changes in their self-efficacy beliefs and teacher-researcher efficacy beliefs. In a different but relevant context, Cabaroglu (2014) investigated the effect of action research engagement with preservice teacher-researchers and found that the teachers experienced growth in self-efficacy about teaching, boosted self-awareness, developed problem-solving skills, and promoted autonomous learning.

Although there are numerous dimensions of cognitive, social, and pedagogical benefits of action research, links between engaging in action research and potential change in mindset and self-efficacy are yet to be explored. The action research in our study is based on a "performative dimension" (Martí, 2015, p.12), which we operationalized in three ways as teacher-led research into self-selected pedagogical issues: (a) to critically reflect on their own understandings of social realities, (b) to improve their practices, and (c) to disseminate their research process and results within a relatively wider community through publications or presentations. We argue that including all these three stages being actively engaged by the teacher, action research can impact mindset when accompanied by the growth in self-efficacy beliefs about doing research. This research aims to test such a hypothesis with a group of English language teachers who have had varying degrees of active engagement in action research over the last five years.

Our research questions include:

1. To what extent does conducting action research affect English language teachers' mindset and their perceived teacher-researcher self-efficacy beliefs?
2. Is there a relationship between teacher-researchers' engagement in doing action research and their mindset that is mediated by their perception of their self-efficacy?

## Method

### Participants and Procedure

A total of 219 (153 female, 66 male) English language teachers at a university who actively engaged in conducting action research at various times in their career participated in this study. This sample consisted of teachers who had completed master's degrees (n = 151) or doctoral degrees (n = 68) in the field of English language teaching programs in Turkey, and they teach general English courses. The average age of participants was 33.55 years (SD = 6.48) (see Appendix 1). The teachers received an invitation email to participate in the study. Participation was voluntary, and no remuneration was provided. Only the participants consenting to fill in the surveys were included in the study. Institutional Review Board approval was not required at the time of data collection of this study.

## Instruments

For this study, the English language teachers completed a survey consisting of an 8-item Teacher-Researcher Efficacy Beliefs Scale, a 16-item Dweck Mindset Instrument, and a background questionnaire. The questionnaires were sent electronically.

The *Dweck Mindset Instrument (DMI)*, developed and created by Carol Dweck, was used to assess how teachers view their overall mindset toward intelligence and talent (Dweck, 2006). The DMI consists of 16 items that are rated on a 6-point Likert scale from 1 = strongly agree to 6 = strongly disagree. Scores for intelligence and talent are averaged separately, as they are considered separate factors (items 1–8 together and 9–16 together). Average scores between 1.0 and 3.0 are considered fixed trait, between 3.1 and 3.9 undecided, and between 4.0 and 6.0 malleable (growth) trait. Sample items include "You have a certain amount of intelligence, and you really can't do much to change it" and "You can learn new things, but you can't really change your basic intelligence."

The *Teacher-Researcher Efficacy Scale (TRE)*, based on Borg's (2010) analysis of the qualities of good research, was used to measure teachers' efficacy beliefs and how these beliefs changed over time as they become more experienced in doing research (Wyatt & Dikilitaş, 2016). This 8-item scale was placed on a 9-point Likert scale ranging from "not at all" to "a great deal." Sample items are as follows: "To what extent are you able to produce research that contributes to knowledge, with implications for practice?"; "To what extent can you identify an issue that needs researching?"

## Data Analyses

All data were analyzed by using the SPSS computer program. A descriptive analysis was conducted for easy interpretation of data. First, to test the effect of the levels of a categorical independent variable, frequency of conducting action research, on two continuous dependent variables, language teachers' mindset and their perceived self-efficacy beliefs, we ran a one-way multivariate analysis of variance (MANOVA). Second, we ran a path analysis to test both the linear and mediated relationships between the variables.

## Results

*Research Question 1: To what extent does conducting action research affect English language teachers' mindset and their perceived teacher-researcher self-efficacy beliefs?*

The three variables that this question is dealing with are the language teachers' mindset and their perceived self-efficacy beliefs as the dependent variables and frequency of conducting action research as the independent variable. In this study, teachers' involvement in action research was operationalized as publishing articles in journals or presenting them in conferences about issues related to taking actions and researching the effects of those actions in the classroom. The data on action research were therefore collected as frequencies of publication and presentation of articles. For this reason, action research was first defined as the sum of published and presented articles. Then, the whole numbers were divided into three categories with levels defined as 0–2 (1), 3–5 (2), and 6+ (3). This step was taken because the effect of engagement in action research on teachers' mindset and self-efficacy could not be investigated without changing action research to a categorical variable.

With this change in the measurement scale of the independent variable, we used two continuous dependent variables and one categorical independent variable. To test the effect of the levels of a categorical independent variable on two continuous dependent variables, running a one-way MANOVA was necessary. MANOVA has some assumptions that should be examined before running this test. The first is multivariate normality of residual terms, the examination of which is not necessary when the number of subjects is larger than 30. The number of participants in this study was 219. The second assumption is homogeneity of variances between the levels of the independent variable and the levels of the dependent variables. The following table indicates that this assumption has been met for the mindset variable but not for self-efficacy. However, the violation of this assumption regarding the second dependent variable, is not so serious as to deter us from proceeding with the analysis because MANOVA is robust against minor violations of normality and homogeneity.

**Table 1.**

*Tests of Homogeneity of Error Variances*

| | F | df1 | df2 | Sig. |
|---|---|---|---|---|
| Mindset total | .021 | 2 | 216 | .979 |
| Teacher-researcher efficacy beliefs total | 4.024 | 2 | 216 | .019 |

Note. Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

The third assumption of MANOVA is homogeneity of variance-covariance matrices, which is tested in SPSS by Box's variance-covariance matrices test. The sig value of this test should be larger than .001 for the assumption to be assumed as satisfied, which is the case here.

**Table 2.**

*Box's Test of Equality of Covariance Matrices*

| | |
|---|---|
| Box's M | 19.611 |
| F | 3.139 |
| df1 | 6 |
| df2 | 13302.880 |
| Sig. | .004 |

Note. Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

The fourth and fifth assumptions of MANOVA are the lack of outliers and the lack of cases that exert excessive influence on the model. The first of these assumptions is examined by the Mahalanobis distance test, and the second, by the Cook's distance test. The maximum Mahalanobis value for a MANOVA with two independent variables should not exceed 13.82, and the Cook's distance should be between +2 and -2. The closer the Cook's distance is to 0, the better the situation is because it is an indication that only one or a few cases exert undue influence on the model. As Table 3 shows, while the Mahalanobis distance is larger than the critical value, the Cook's distance is very close to zero, which is suggestive of only one or only a couple of cases exerting excessive influence on the model. Since the sample size is relatively large, these one or few cases need not to be worried about.

**Table 3.**

*Mahalanobis and Cook's Distances*

| | Minimum | Maximum | Mean | Std. deviation | N |
|---|---|---|---|---|---|
| Mahal. distance | .013 | 39.706 | 1.991 | 3.545 | 219 |

| | | | | | |
|---|---|---|---|---|---|
| Cook's distance | .000 | 1.845 | .014 | .125 | 219 |

a. Dependent variable: teachers' mindset levels

In terms of the two remaining assumptions of MANOVA, namely, linearity and multicollinearity, since both independent variables are continuous, we can assume that they are linearly related; also, since the correlation between them is very small (r = .07), as represented in Table 4, we can claim that they represent different constructs, and therefore the lack of multicollinearity is satisfied.

**Table 4.**

*Correlation Between Dependent Variables*

| | | Mindset total | Teacher-researcher efficacy beliefs total |
|---|---|---|---|
| Mindset total | Pearson Correlation | 1 | .070 |
| | Sig. (2-tailed) | | .306 |
| | N | 219 | 219 |

After examining all assumptions of MANOVA, the main test was run. Table 5 gives us an indication of the number of participants falling in each action research group.

**Table 5.**

*Number of Participants Falling in Each Action Research Group*

| | | Value Label | N |
|---|---|---|---|
| Action research levels | 1.00 | 0–2 | 175 |
| | 2.00 | 3–5 | 29 |
| | 3.00 | 6–15 | 15 |

Table 6 presents a descriptive statistics report of the dependent variables.

**Table 6.**

*Descriptive Statistics of the Dependent Variables*

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Mindset total | 219 | 41.00 | 96.00 | 56.4658 | 6.37242 |
| Teacher-researcher efficacy Beliefs total | 219 | 8.00 | 72.00 | 52.8493 | 11.85192 |
| Valid N (listwise) | 219 | | | | |

The omnibus multivariate test below reveals that the effect has been significant. All four tests are showing whether the level of engagement in action research had any effect on the participants' mindset and self-efficacy. However, to know if one or both of the dependent variables were affected, we tested the between-subjects effects (see Table 8).

**Table 7.**

*Multivariate Tests*

| Effect | | Value | F | Hypothesis df | Error df | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|---|
| ACTlevels | Pillai's Trace | .052 | 2.899 | 4.000 | 432.000 | .022 | .026 |
| | Wilks' Lambda | .948 | 2.916[b] | 4.000 | 430.000 | .021 | .026 |
| | Hotelling's Trace | .055 | 2.933 | 4.000 | 428.000 | .021 | .027 |
| | Roy's Largest Root | .052 | 5.583[c] | 2.000 | 216.000 | .004 | .049 |

Table 8 reveals that of the two dependent variables, only teacher-researchers' self-efficacy was affected by conducting action research, and the variable of mindset remained almost unaffected.

**Table 8.**

*Tests of Between-Subjects Effects*

| Source | Dependent Variable | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|---|
| ACTlevels | mindset total | 54.321 | 2 | 27.161 | .667 | .514 | .006 |
| | teacher-researcher efficacy beliefs total | 1358.524 | 2 | 679.262 | 5.014 | .007 | .044 |

The last column shows the effect size of this effect, which is r = .044. Based on Cohen's criteria, this is a moderate effect size. Cohen's criteria are 0–.01 = small effect, .01–.06 = moderate effect, and .06–.14 and above = large effect. The case summaries report that follows shows that the mean of teacher-researchers' self-efficacy belief increases dramatically as the teachers do more action research (as we move from level 1 to level 3). But no important change occurs in the means of their mindset. On the other hand, the standard deviation of the self-efficacy belief decreases substantially, which means that variation among teacher-researchers' self-efficacy levels off as their experience in conducting action research grows. But there is almost no decline in variance among the mindset standard deviations, which points to the ineffectiveness of conducting action research in leveling off mindset variance among the groups.

**Table 9.**

*Case Summaries Report*

| Action research levels | | Mindset total | Teacher-researcher efficacy beliefs total |
|---|---|---|---|
| 0–2 | N | 175 | 175 |
| | Mean | 56.4800 | 51.8686 |
| | Std. Deviation | 6.60272 | 12.36234 |
| 3–5 | N | 29 | 29 |
| | Mean | 57.2069 | 54.2759 |
| | Std. Deviation | 5.38768 | 9.11787 |
| 6–15 | N | 15 | 15 |
| | Mean | 54.8667 | 61.5333 |

| | | | |
|---|---|---|---|
| | Std. Deviation | 5.34344 | 4.95504 |
| Total | N | 219 | 219 |
| | Mean | 56.4658 | 52.8493 |
| | Std. Deviation | 6.37242 | 11.85192 |

*Research Question 2: Is there a relationship between teacher-researchers' engagement in doing action research and their mindset that is mediated by their perception of their self-efficacy?*

In the figures that follow, ARS represents the total number of articles published and presented, TRE stands for teacher-researchers' self-efficacy beliefs, and DMI represents teachers' mindset measured by Dweck's Mindset Instrument. The fit indices for the models will not be reported because this study is interested in only the regression weights, not the fit of the models. Models, whether they fit the data perfectly or not, will generate the same regression weights with the same data.

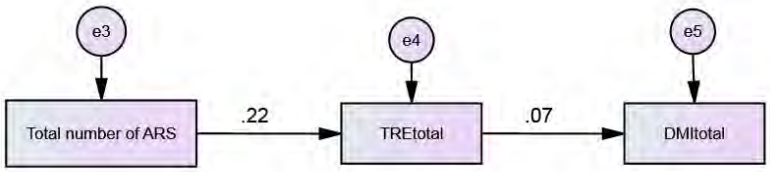


*Figure 1:* Linear relationship between ARS, TRE, and DMI

The linear analysis of the relationship between frequency of doing action research, teacher-researchers' self-efficacy, and mindset reveals a positive noticeable relationship (ß = .22) between teachers' frequency of doing action research and their researcher self-efficacy beliefs, but not so noticeable a relationship between the totals of researcher self-efficacy beliefs and mindset. The implication might be that a high perception of self-efficacy does not guarantee conducting more action research.

The second part of the question sought to find if teachers' mindset is mediated by their researcher self-efficacy levels achieved through doing action research. Mediation is said to have happened if the total effect of the exogenous variable (total number of ARS) on the endogenous variable (DMI total) is weakened as result of the mediation of a third variable (TRE). A schematic representation of the variables of this study and their roles, as conceptualized in the second question, is given in Figure 2.

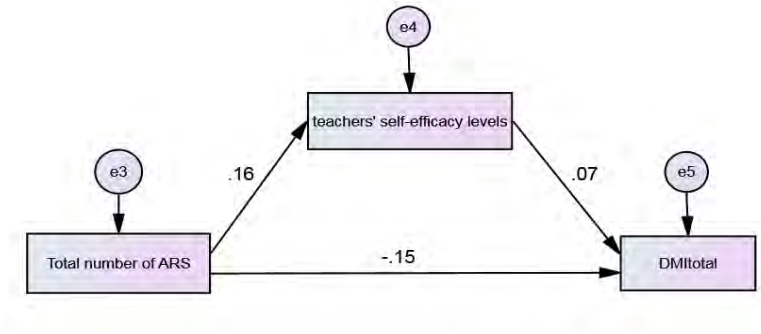


*Figure 2:* Mediated relationship between ARS, TRE, and DMI

The regression weights calculated show that mediation happened. When the indirect effect, found by multiplying the values above the arrows moving from ARS to TRE and from TRE to DMI (0.16 X 0.07) and adding the result with the value of the direct effect of doing action research on teacher-researchers' mindset, was calculated, the total effect of the engagement in action research on teacher-researchers' mindset dropped to 13.8. The important finding, however, is that while the relationship between the frequency of doing action research and teacher researchers' self-efficacy is positive, the relationship between the frequency of doing action research and change in teachers' mindset is negative.

## Discussion

Our first research question addressed the extent to which action research can affect our participants' mindset and their perceived teacher-researcher self-efficacy beliefs. We found a dramatic increase in the self-reported teacher-researcher self-efficacy beliefs as the participants engaged in more research. This positive regression appears to be corroborated by Henson (2001), Wyatt (2008), and Wyatt and Dikilitaş (2016). However, we found no significant change in the mindset of these teachers who underwent a change in their self-efficacy beliefs. We conclude from this contrasting result that self-efficacy seems to be relatively more quickly influenced or even changed incrementally, while mindset appears to require a relatively longer time of engagement in research. The change in self-efficacy can be justified by the fact that it is relatively more fluid, whereas mindset is deeply rooted and more solid in nature, having been formed by experiences and attitudes over a long period of time. Self-efficacy beliefs are more likely to change since positive experiences and support may cause them to increase. It bears emphasizing that time, effort, and practice are the key factors for changing our mindsets (Dweck, 2006). Edwards and Burns (2016a) and Seider and Lemma (2004) also report that these factors are key to professional development through action research. Once time, effort, and practice are invested in action research over time, its sustainable impact might lead to improvement in language teachers' reflective mindset, as our study highlighted. Change in mindset, in our case also, requires a long-term process that involves research in context with multiple activities, ranging from doing research, writing, dissemination, and publishing, which prolong the critical engagement in practical research topics. Engaging in action research substantially, as we argue, contributes to English language teachers' sense of self-efficacy, while this engagement may have a long-term effect on teachers' mindset. Although some researchers have argued

that self-efficacy level is one of the central factors that influence change in mindset (Zilka et al., 2019), teachers may lose their interest in conducting action research after gaining confidence in their abilities to do so. Well-thought-out research needs more time, and therefore, the interval between research occasions may increase. In other words, the frequency of doing action research decreases, but the importance of the selected topics and the quality of the research conducted on them increase. We argue that continued personal and professional commitment of teachers toward sustainable engagement in action research can ultimately lead to higher levels of teacher-researcher self-efficacy beliefs and growth mindset. The sustainable impact of action research on language teacher development displays itself when teachers are involved with on-going professional development activities like presenting in conferences or other events and publishing their work as a chapter, a paper, or a critical practical report in a blog (Edwards & Burns, 2016a). We also believe that the context of teacher research engagement might have been involved since degree of support in context is as an external factor that might impede mindset change (Zilka et al., 2019). Since we did not measure the effect of motivational and support-related factors during research engagement, we might consider these as confounding factors that might have affected the mindset change.

Our second research question explored a relationship between teacher-researchers' engagement in doing action research and their mindset mediated by their perception of their self-efficacy. We found that while the frequency of doing teacher research is positively related to a significant increase in teachers' self-efficacy beliefs, this is not the case for their mindset. Two interpretations are possible for this situation. One interpretation might be that as teachers get more confident in their ability to conduct action research, their enthusiasm for conducting such research diminishes. In other words, when teachers are still at the earlier stages of their profession, they have greater energy for conducting action research, but they lose their enthusiasm as they get more and more confident in conducting such research. The fact that ability does not directly translate to doing more research of this kind may be because they think that they have already had their fair share of conducting this type of research.

A second interpretation may be that as teachers become more experienced, the intervals between occasions of conducting action research lengthen, but the complexity and importance of the selected topics increase. This interpretation seems more plausible because novice teachers are usually in a rush to select a topic and investigate it without thinking too much about its importance, history, or justifiability. But more experienced teachers deliberate much longer about the appropriateness of the topic, its relevance, novelty, and implications for their classrooms. In other words, concatenation is not a positive point. What is important is engaging in studies that may have important implications for the field and doing research that is thorough and flawless to the greatest extent possible.

Despite the fact that the participants in our study have completed their advanced degrees in the field of teaching, if they hold false assumptions in their mindset, they do not yet possess a growth mindset (Dweck, 2014). Keating and Heslin (2015) assert, "People think, feel, act, and interact like someone with a growth mindset when they construe challenging situations as opportunities for learning, growth, and attainment" (p. 338). More specifically, if completing certain tasks such as presenting papers in

conferences, publishing manuscripts, or writing research proposals seems difficult for teachers, it is because they see their abilities as set. And they may not put in time and effort toward professional engagement.

## Implications

The findings of this study revealed that English language teachers who were involved in action research projects as part of their graduate studies programs developed higher degrees of researcher efficacy beliefs in their careers. Another valuable result of our study is that despite the dramatic positive changes reported in teachers' researcher self-efficacy beliefs, no significant relationship between teachers' mindset and self-efficacy beliefs was demonstrated. Clearly, this study contributes to our understanding that a growth mindset can be improved incrementally (Dweck & Yeager, 2019), and it is essential to expand the notion of sustainability in teachers' engagement in action research for long-term impacts rather than looking for an immediate impact. To promote good teaching and sustained systematic inquiry, more opportunities for professional development through action research need to be offered to in-service English language teachers on a regular basis. Recently, Dikilitaş and Griffith (2017) suggested that action "implies … some kind of active investigation of whatever is seen to be the problem to be fixed, the puzzle to be considered, the question to be answered, or the issue to be addressed" (p. 1). Given the context described, therefore, the teacher educators in graduate programs need to encourage their students to be involved in action research throughout their teaching careers to be able to experience the long-term effects of growth mindset on their profession.

It is worth noting that the English language teachers in our study received the necessary professional guidance they needed when they were assigned to conduct action research projects to fulfil their graduate program study requirements. It is widely acknowledged that action research is considered an option for teachers' professional development. Our study did not investigate whether the participants work in a positive school climate where there is strong support from the administrators to engage in action research. Therefore, we recognize that more empirical research needs to be done integrating the school environment variables to investigate how action research contributes to teachers' mindset and researcher efficacy beliefs. Given that the impact of teacher research could be transformative (Borg, 2010), the effects of external factors such as school support (Yuan & Lee, 2015) should be considered to explore the positive impact of action research on teachers' mindset. While there is relatively little literature to understand "sustainable teacher action research," there is a noticeable lack of research investigating the impact of action research in the English language teaching context. To explain how changes in language teachers' mindset occur and how they develop over time, more diverse methods, longitudinal studies, or ethnography needs to be utilized to investigate language teachers' mindset. Additionally, to ensure sustainable engagement in action research and foster a growth mindset in language teachers' careers, our study illuminated the need for improvements in our three ways of operationalizing action research:

- In setting up research-engaged activities in teachers' workplaces, such as research teams through which they can (a) critically and reflexively discover their self-understandings and challenge them to adapt to the changing dynamic teaching context (b) by doing contextualized inquiry-driven research into the issues that need improvement and adaptations.
- In giving opportunities for teachers to share and disseminate their individual or collaborative action research results with the rest of the teachers and staff (c) where their emerging and dynamically changing understandings and practices are subject to the critiques of others, during which they can validate or strengthen new or adapted teaching practices.
- In recognizing teachers' action research by offering tangible or intangible rewards including time off, promotions, new roles, or institutionally voiced appreciation and consideration in order to motivate teachers to engage in research-driven professional learning.

Our study is the first to explore the association between language teachers' mindset and teacher-researcher self-efficacy beliefs in the use of action research. In the process of adopting a growth mindset, individuals improve their intellectual skills through effort and grit, including being persistent in working toward long-term goals (Duckworth & Quinn, 2009). Therefore, keeping in mind that perseverance, training, and hard work foster a growth mindset (Dweck, 2006), this study also revealed that being persistent in delving into action research will ultimately encourage teachers to develop more of a growth mindset about their competencies in their career. Given that there is always a need for teachers to self-motivate to take their action research forward, we must reiterate the fact that support from school management is highly valuable. Ongoing, timely, and meaningful feedback from administrators as well as from trainers or mentors will help teachers develop a growth mindset and shift the way they problematize issues in their own classrooms. This support should also include the incentives that help them disseminate their action research in communities that can expand the learning opportunities, thereby increasing their self-efficacy and paving the way to developing a growth mindset in the long term.

We call for urgency in offering research-based teacher training programs for all teachers—student teachers who are in undergraduate and graduate degree programs as well as in-service teachers. Thus, teachers' growth mindset beliefs can potentially grow, and they can build trust in engaging sustainable professional development activities to cope with the challenges they may encounter in their careers. While there is still a great need to study the association between a growth mindset and teachers' self-belief systems, one might extrapolate that those teachers using and improving their inquiries via action research inevitably improve the quality of their work. We strongly believe that to nurture a growth mindset in English language teachers is vital not only for teachers to feel like more confident, research-engaged professionals in their discipline but also to meet the changing needs of students in the twenty-first century (Yorks & Nicolaides, 2013). As Guskey (2000) asserts, teacher development is a long-term process in which teachers consciously bring positive changes and improvements into their practice. Thus, English language teachers who become more involved in action research over time will experience transformation in their professional skills and growth mindset.

*Ilknur Eginli is an Assistant Professor in the Department of Education at Istanbul Medipol University. Her main areas of interest include psychology of language teachers and learners, language teachers' professional competencies, and teacher education.*

*Kenan Dikilitaş is a Professor of University Pedagogy at the University of Stavanger. His research areas include professional development, teacher education, and action research.*

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## Appendix 1

Gender as a whole

*Descriptive Statistics*

| | N | Mean | Std. Deviation |
|---|---|---|---|
| Gender | 219 | 1.70 | .460 |
| Age | 219 | 33.55 | 6.480 |
| Highest college degree | 219 | 1.31 | .462 |
| Teaching experience yrs | 219 | 10.24 | 6.193 |
| Type of school | 219 | 1.40 | .490 |
| Teachers' self-efficacy levels | 219 | 2.6301 | .57884 |
| Valid N (listwise) | 219 | | |

Gender differentiated

*Descriptive Statistics*

| Gender | | N | Mean | Std. Deviation |
|---|---|---|---|---|
| Male | Gender | 66 | 1.00 | .000 |
| | Age | 66 | 32.82 | 5.759 |
| | Highest college degree | 66 | 1.35 | .480 |
| | Teaching experience yrs | 66 | 9.17 | 5.471 |
| | Type of school | 66 | 1.38 | .489 |
| | Teachers' self-efficacy levels | 66 | 2.7273 | .51277 |
| | Valid N (listwise) | 66 | | |

| | | | | |
|---|---|---|---|---|
| Female | Gender | 153 | 2.00 | .000 |
| | Age | 153 | 33.87 | 6.761 |
| | Highest college degree | 153 | 1.29 | .454 |
| | Teaching experience yrs | 153 | 10.69 | 6.443 |
| | Type of school | 153 | 1.41 | .493 |
| | Teachers' self-efficacy levels | 153 | 2.5882 | .60185 |
| | Valid N (listwise) | 153 | | |