Academic Self-Efficacy and Its Effect on Academic Engagement: Meta-Analysis

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Previous scholars have explored the effect of self-efficacy on academic engagement. Self-efficacy positively affects academic engagement. However, it is not known whether the impact of self-efficacy on academic engagement differs significantly depending on potential moderator variables. The study aimed to meta-analyse correlational studies on self-efficacy and academic engagement between 2015 and 2022. Meta-analysis was used to examine correlation studies on the effect of self-efficacy on academic engagement. The meta-analysis calculated 68 effect sizes for the 24 studies. In accordance with the PRISMA guidelines, this investigation was conducted in various phases, including problem identification, data collection, screening, evaluation, and extraction. The information was obtained from peer-reviewed journals indexed in databases such as Scopus, EBSCOhost, ProQuest, and Eric searching for articles published in the field. Data analysis was performed using JASP. The study found that the random effects model and the effect size were significant, with a moderate average effect size (d=0.54). The results also indicate that the effects of self-efficacy on academic engagement vary significantly depending on geographical regions. The results have pedagogical implications since they suggest that increasing the academic engagement of learners requires increasing academic self-efficacy and noticing the geographical regions of learners.

Keywords: self-efficacy, academic engagement, meta-analysis, academic self-efficacy

INTRODUCTION

Over the past few decades, researchers have increasingly focused on studying the effects of academic engagement (AE) on students' success. Numerous studies have associated
AE with academic achievement (Casuso-Holgado et al., 2013; Martin et al., 2016; Tomás et al., 2020; Yoon, 2015; Spedding et al., 2017). Previous studies suggest that student engagement promotes academic success (Hodge et al., 2017). Engagement reduces risky behaviour problems (Li et al., 2020). It enhances positive well-being (Serrano & Andreu, 2016; Khan-Inkeeree et al., 2020) and correlates to positive personal variables such as positive emotions (Oriol et al., 2016). And it has lasting effects on subjective well-being, academic variables, and other positive social outcomes (Broadbent & Poon, 2015; Chen et al., 2020). Risky behaviour problems are less common than problems of lack of school interest. Students who already have much to do with their academic performance can move on to the next level.

Among the findings, AE was found in various studies to have an essential relationship with academic self-efficacy (SE). Previous studies have reported that teacher support is associated with SE and AE (Jang et al., 2016). Motivation for parental autonomy significantly affected AE through SE (Moë et al., 2018). SE is positively related to all vigorous, commitment, and absorption engagement aspects. (Pérez-Fuentes et al., 2019)

Diversity, self-efficacy, and engagement are connected (Zhen et al., 2019). Previous studies have also revealed that self-efficacy, intrinsic motivation, and class atmosphere substantially impact academic engagement in higher education (Wei et al., 2019). Previous researchers, such as Gonzales-Macavilca & Nolberto-Quispe (2019), have shown the association between SE and behaviour, the psychological capital to moderate the relationship between the academic press and AE (Fati et al., 2019). Students with a positive teacher academic press have an increased AE as mediators in SE and resilience. The previous study found that teacher autonomy support is related to student engagement through SE and academic emotions (Li et al., 2020). The SE of self-regulation in learning regarding achievement goals affects AE (Putarek & Pavlin-Bernardi, 2020).

The findings on SE are also supported by Robayo-Tamayo et al. (2020), reporting that academic support mediates the effect of SE on AE. The result revealed that SE affects social presence and directly affects learning engagement (Doo & Bonk, 2020). SE influences AE, and autonomous motivation reflects this on peers and AE (Hopkins et al., 2020). Meanwhile, Azila-Gbettor et al. (2021) report that SE and attitudes influence students' statistics engagement. The results of other studies also show that students with high SE and positive behaviour towards statistics can help students engage in their learning at a high level and improve their performance in statistics courses (Gopal et al., 2018). SE is positively associated with AE (Kuo et al., 2021). SE is a factor that influences both emotional and cognitive engagement (Kuo et al., 2021).

The findings of these researchers demonstrate that SE and AE are strongly correlated. However, it is unclear whether SE influences AE when associated with potential moderator variables such as educational level, geographic region, and developmental stage. Therefore, it is crucial to study the effects of potential moderator variables on the impact of SE on AE. This meta-analysis study aims to determine the influence of SE on AE based on potential moderator variables. Our meta-analysis examines how SE affects AE based on moderator variables such as level of education, geographical region, and international variations.
stage of development. We offer a systematic review and synthesis of the findings of relevant studies. In particular, our meta-analysis aims to answer the following two research questions:

1. To what extent does academic SE affect AE?
2. How do possible moderator variables (level of education, geographical regions and developmental stage) moderate the effect of SE on AE?

Literature Review

Theoretical view of academic engagement

Academic engagement (AE) represents the psychological efforts and investments of a student in learning, mastering skills, and completing schoolwork (Newmann & Lamborn, 1992). It encompasses the time, effort and participation of students in academic activities that contribute to knowledge development and achievement of educational goals (Alrashidi et al., 2016; McClenny, 2006). AE includes students' behavioural intensity, emotional quality, and personal efforts in learning activities (Reeve & Lee, 2014).

AE is characterised by positive motivation, satisfaction and commitment to educational achievement (Spedding et al., 2017). It is linked to enthusiasm and happiness for studies (Tuominen-Soini & Salmela-Aro, 2014) and a positive state of mind marked by vigour, dedication, and absorption (Schaufeli et al., 2002). AE is a persistent emotional state positively associated with academic achievement and remains relatively stable over time (Ketonen et al., 2019; Salanova et al., 2010).

In this study, student AE is defined as a satisfying state of mind characterised by vigour, commitment, and absorption, aligning with Schaufeli et al.'s concept of (2002), which closely relates to work engagement (Tuominen-Soini & Salmela-Aro, 2014).

Self-Efficacy perspectives

Self-efficacy is derived from social cognitive theory and refers to a person's belief in their ability to complete tasks or perform jobs (Cansoy et al., 2018; Bandura, 1997a). This belief is based on achieving goals and can influence how people feel, motivate themselves, think, and behave (Doo & Bonk, 2020; Zander et al., 2018). In other words, when faced with adversity, self-efficacy can impact the choice of activities, struggles, efforts, and performance.

People with high self-efficacy tend to perform actions they believe they can do and feel confident in their abilities in a particular activity or situation and in various activities and situations (Bandura, 1997b; Zander et al., 2018). On the other hand, people with low self-efficacy tend to choose low-difficulty tasks and have limited confidence in their abilities, often limiting themselves to specific activities and situations. They are easily shaken by failures and experiences that weaken them. However, they tend not to give up easily, work hard, and are tenacious in increasing their efforts despite various obstacles (strength; Bandura, 1997b).

Academic self-efficacy is a subset that characterises a person's confidence in their ability to succeed in a particular educational setting (Liu et al., 2020). It refers to a person's
self-perception or confidence in performing activities at a predetermined level despite academic difficulties (Honickie & Broadbent, 2016; Zander et al., 2018). Students with excellent academic self-efficacy are confident in planning and executing the necessary steps to achieve their educational goals (Bandura, 1997b). Academic self-efficacy implies confidence in their ability to perform academic tasks at a specified level or achieve a specific academic goal. Therefore, in this study, academic self-efficacy refers to a student's confidence in their ability to organise and perform the necessary actions to achieve specific results in the academic field.

**Self-Efficacy and academic engagement**

Academic engagement (AE) is influenced by various factors, including self-efficacy (SE) (Chen et al., 2021; Mesurado et al., 2016a; Oriol-Granado et al., 2017; Yang et al., 2021; Vidić, 2021). Students with high academic SE tend to feel confident in completing tasks of varying difficulty, not just those considered easy. In addition, they have strong expectations that motivate them to persevere in accomplishing academic tasks despite various difficulties. Abu-Hilal & Al-Abed (2019) state that SE significantly predicts student engagement. In a study by Pérez-Fuentes et al. (2019), SE was positively correlated with vigour, dedication and absorption, further supported by Hopkins et al. (2020), who showed that SE positively influences AE. Kuo et al. (2021) also found that SE contributes to cognitive and emotional engagement.

Several studies have shown that SE, intrinsic motivation, and classroom atmosphere significantly affect AE of higher education students (Wei et al., 2019). Similarly, Gopal et al. (2018); Sánchez-Rosas et al. (2023) found that students with SE and a positive attitude towards courses have a significant effect on engagement in students. Therefore, it is essential to consider SE when designing interventions to improve academic engagement among students.

**METHOD**

**Data Search Strategy and Study Selection**

This meta-analysis focuses on quantitative studies indicating a correlation between SE and academic engagement. The researchers searched for various electronic reference databases such as Scopus, EBSCOhost, ProQuest, and Eric, searching for articles published in the field. Search terms (self-efficacy and academic engagement) are used as keywords. The initial search yielded 2,102 studies. Scopus has 401 studies, and EBSCOhost 572. And 557 papers by ProQuest and 572 articles by Eric (see Figure 1). In addition to conducting electronic investigations, we review the titles and abstracts of identified studies and the reference lists of related literature reviews. The research results publication date is limited to 2015-2022.

**Inclusion and Exclusion Rules**

A database search found 2,102 studies. The 368 relevant studies are the result of the initial screening. The selected studies must meet the criteria, including participants based on education level, sufficient statistical information to calculate effect size, and correlational research methodology, the studies were conducted between 2015-2022, and have a relationship with SE or academic commitment. Three hundred and sixty-
eight studies were abandoned, while 79 were kept for additional investigation and encoding. The meta-analysis analysed 24 studies, as shown in Figure 1.

![Figure 1](image)

The PRISMA guidelines for the literature search

**Data Evaluation**

Twenty-four studies produced sixty-eight effect sizes. The characteristics of the code include information on participants: level of education, geographical regions, and design of the developmental stage. Statistics include the sample size (N), average effect size (d), and standard error (se) presented in Table 1.

<table>
<thead>
<tr>
<th>Studies</th>
<th>N</th>
<th>d</th>
<th>se</th>
<th>Level of Education</th>
<th>Geographical Regions</th>
<th>Developmental Stage</th>
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<tbody>
<tr>
<td>Abu-Hilal (2019a1)</td>
<td>900</td>
<td>0.87</td>
<td>0.03</td>
<td>SS</td>
<td>WA</td>
<td>EA</td>
</tr>
<tr>
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<td>1.95</td>
<td>0.03</td>
<td>SS</td>
<td>WA</td>
<td>EA</td>
</tr>
<tr>
<td>Abu-Hilal (2019a3)</td>
<td>900</td>
<td>1.95</td>
<td>0.03</td>
<td>SS</td>
<td>WA</td>
<td>EA</td>
</tr>
<tr>
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<td>1.00</td>
<td>0.04</td>
<td>CLG</td>
<td>AF</td>
<td>LA</td>
</tr>
<tr>
<td>Azila-Gbettor et al (2021a2)</td>
<td>512</td>
<td>0.86</td>
<td>0.04</td>
<td>CLG</td>
<td>AF</td>
<td>LA</td>
</tr>
<tr>
<td>Buric &amp; Macuka (2017a1)</td>
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<td>0.97</td>
<td>0.03</td>
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<td>SEE</td>
<td>LA</td>
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<td>LA</td>
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<td>LA</td>
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<td>LA</td>
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<td>0.06</td>
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<td>SA</td>
<td>LA</td>
</tr>
<tr>
<td>Hong et al (2021a1)</td>
<td>332</td>
<td>0.60</td>
<td>0.05</td>
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<td>EA</td>
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<tr>
<td>Hong et al (2021a2)</td>
<td>332</td>
<td>0.81</td>
<td>0.06</td>
<td>SHS</td>
<td>SA</td>
<td>EA</td>
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<tr>
<td>Hopkins (2020a1)</td>
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<td>CLG</td>
<td>OT</td>
<td>LAC</td>
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<tr>
<td>Hopkins (2020a2)</td>
<td>547</td>
<td>0.34</td>
<td>0.04</td>
<td>CLG</td>
<td>OT</td>
<td>LAC</td>
</tr>
</tbody>
</table>

Coding Process

In this comprehensive meta-analysis, all studies that met the eligibility criteria were organised according to various characteristics, such as details of the participants, such as the level of education, geographical regions, and the developmental stage. Furthermore, essential statistics were collected to determine the sample size (N), effect size (d), and
standard error (se) for this extensive analysis. Table 1 provides a summary of each investigation's findings.

Moderators
Meta-analysis techniques are appropriate for assessing any confounding factors that may have influenced the conclusions of previous studies. Three potential moderator variables, such as educational level, geographic regions, and developmental stage, were identified, as shown in Table 1.

Extraction and Calculation of Effect Sizes
The researchers extracted 68 effect sizes from the remaining 24 studies. After we obtained the original correlation coefficient r between SE and AE, we then converted all correlations to Fisher's Z score Fisher. We used Fisher's Z score to do all of the analysis. The average effect size results and their confidence intervals are converted back to the correlation coefficient.

Coding and Effect Size Reliabilities
To determine the level of intercoder reliability, three authors independently coded all 68 effect sizes derived from 24 studies and three moderators at least twice each. The Pearson correlation was applied to investigate the effect size's dependability. The agreement served as a basis for determining the trustworthiness of the various other essential factors. Any contradictions were discussed until they resolved. The magnitude of the first effect and the reliability of the moderator code are presented in Table 2.

Table 2

<table>
<thead>
<tr>
<th>Inter-coder reliability</th>
<th>n</th>
<th>r</th>
<th>Level of education</th>
<th>Geographical regions</th>
<th>Developmental stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability</td>
<td>1.000</td>
<td>1</td>
<td>0.998</td>
<td>0.999</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Data Analysis
Researchers adopt a meta-analysis design to combine the results of various quantitative studies that indicate a correlation between self-efficacy (SE) and academic engagement. This design enables researchers to assess the overall strength of the relationship and explore potential moderators. It is a rigorous and systematic approach to synthesising existing research. Given that varied research methods and sample characteristics would have affected the actual correlation between students' SE and AE, we used random-effects models as the methodological basis for synthesis. Pearson's correlation coefficient is the metric we aim for regarding the effect size. We adjusted Pearson's r scale to Fisher's z scale to normalise the sampling distribution. After obtaining all effect sizes based on each study's precision, we calculated the usual mean correlation and the 95% confidence interval. The Cochran Q test and the I² statistic were used to examine the heterogeneity of effect sizes.

Applications for Meta-Analysis
The analysis of potential moderators for the effect of SE on AE was carried out using Excel and JASP software. JASP is compatible with various data formats, enabling
efficient and accurate analysis of quantitative data. Researchers use this software to calculate Q statistics that include QB (that is, Q values to test between-group differences) and QW (that is, Q values to stay within group variability). The researchers used confidence interval plots (CI) and plot funnels to analyse the effect size and possible publication bias.

**Publication Bias**

The researchers used plot funnels and safe trimming and fill methods to evaluate publication bias. If there is no publication bias and the effects originate from a finite population, they will be dispersed proportionally and form the appearance of a downward funnel. In a funnel plot, the trim-and-fill approach estimates the number of definitive studies from a meta-analysis and changes the mean proportionately. Egger's test examines the asymmetry of the funnel plot. More detailed studies appear at the top of the funnel plot, whereas smaller, less detailed studies show at the bottom.

**Moderator Analysis**

The researchers looked at three variables that could change the effect size: level of education, geographical regions, and developmental stage. All of these were grouped into categories. Moderator analyses were performed based on the correlation between SE and AE. In moderator analyses, researchers looked to see if the size of the effects changed depending on the possible moderators. After calculating the summary effect size and the confidence interval, use the transformed values. The value has been changed to the original correlation matrix, allowing the results to be effectively understood.

**FINDINGS**

**Publication Bias Analysis**

![Funnel plots for effect sizes](image)

Figure 2

Funnel plots for effect sizes

The funnel plot shows 24 selected studies submitted to a symmetrically distributed meta-analysis. The funnel plot reveals more positive than negative effects and many significant effects. Figure 2 shows no indication of funnel plot asymmetry.
Figure 3
The confidence interval plot of effect sizes
**Overall Effect Size**

Figure 2 shows the adjusted mean and variance homogeneity tests for the 68 different effect sizes. Due to the large variety of impact sizes, the researchers continue with a comprehensive random-effects model. The average effect size was moderate (d=0.54). These findings established the period within which 95% of the total population effects could occur. It ranged from 0.47 to 0.62, demonstrating that SE affects academic engagement.

**Weighted mean of effect sizes**

The total weighted mean and homogeneity tests for the 68 independent effect sizes are shown in Table 3. Due to the variety in effect sizes, we began with an overall random-effects model. The overall mean effect size was substantial (d = 0.54). This was used to predict the range whereby 95% of all population effects could assume normality. This interval ranged from 0.47 to 0.62, demonstrating that SE and AE significantly impact.

Table 3

| Weighted mean of effect sizes for the effect of SE on AE based on moderator variables |
|---------------------------------|-----------------|-------|-------|-------|-------|-------|
| All Studies                     | k   | d     | se   | 95% CI | 95% CI | GB   | df   |
| Level of Education              | 1376.40 | 5   |
| Elementary School               | 18  | 0.387 | 0.048 | 0.293  | 0.48   | 8.123|
| Secondary School                | 13  | 0.743 | 0.162 | 0.425  | 1.061  | 4.577|
| Junior High School              | 3   | 0.333 | 0.078 | 0.181  | 0.483  | 4.289|
| Senior High School              | 2   | 0.704 | 0.105 | 0.498  | 0.909  | 6.702|
| College                         | 21  | 0.588 | 0.036 | 0.517  | 0.659  | 16.291|
| Others                          | 10  | 0.56  | 0.055 | 0.453  | 0.668  | 10.211|
| Geographical Regions            | 3690.46*** | 8   |
| Southeast Asia                  | 9   | 0.581 | 0.035 | 0.513  | 0.649  | 16.682|
| East Asia                       | 11  | 0.545 | 0.046 | 0.454  | 0.636  | 11.745|
| West Asia                       | 4   | 1.371 | 0.336 | 0.711  | 2.03   | 4.075|
| South Asia                      | 2   | 0.657 | 0.23  | 0.206  | 1.108  | 2.858|
| Southern Europe                 | 7   | 0.517 | 0.041 | 0.436  | 0.598  | 12.559|
| South-eastern Europe            | 7   | 0.515 | 0.105 | 0.309  | 0.721  | 4.9   |
| North America                   | 21  | 0.367 | 0.042 | 0.285  | 0.449  | 8.807|
| Africa                          | 2   | 0.929 | 0.076 | 0.792  | 1.086  | 13.269|
| Others                          | 4   | 0.503 | 0.105 | 0.297  | 0.709  | 4.79  |
| Developmental Stage             | 675.88 | 3   |
| Childhood                       | 20  | 0.387 | 0.047 | 0.302  | 0.472  | 8.909|
| Early adolescence               | 17  | 0.654 | 0.13  | 0.398  | 0.909  | 5.019|
| Late adolescence                | 17  | 0.553 | 0.03  | 0.494  | 0.612  | 18.424|
| Late Adulthood                  | 13  | 0.624 | 0.057 | 0.512  | 0.736  | 10.919|

**Moderator Variable Analysis**

Researchers examined the six potential effect size moderators. Only the source of the research and the type of test were significant modifiers according to the ANOVA-like mixed effects model with moderators (Table 4). Table 4 shows the weighted average effect size for the relationship of self-efficacy and academic engagement between different moderator variables.
The results of moderator analyses with QB and QW

<table>
<thead>
<tr>
<th>Moderators</th>
<th>n</th>
<th>d</th>
<th>se</th>
<th>95% CI</th>
<th>95% CI</th>
<th>GB</th>
<th>QW</th>
<th>P</th>
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<td><strong>Level of Education</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Elementary School</td>
<td>18</td>
<td>0.39</td>
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<tr>
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<td>0.43</td>
<td>1.06</td>
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</tr>
<tr>
<td>Junior High School</td>
<td>3</td>
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<td>0.08</td>
<td>0.18</td>
<td>0.49</td>
<td>11.41</td>
<td>89.50%</td>
<td></td>
</tr>
<tr>
<td>Senior High School</td>
<td>2</td>
<td>0.70</td>
<td>0.11</td>
<td>0.50</td>
<td>0.91</td>
<td>6.65</td>
<td>84.98%</td>
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</tr>
<tr>
<td>College</td>
<td>21</td>
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<td>91.34%</td>
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<tr>
<td>Others</td>
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<td>0.45</td>
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<td>9</td>
<td>0.58</td>
<td>0.04</td>
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<td>25.89</td>
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<td>0.64</td>
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<td>0.52</td>
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<td>0.31</td>
<td>0.72</td>
<td>328.32</td>
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<td></td>
</tr>
<tr>
<td>North America</td>
<td>21</td>
<td>0.37</td>
<td>0.04</td>
<td>0.29</td>
<td>0.45</td>
<td>180.52</td>
<td>90.14%</td>
<td></td>
</tr>
<tr>
<td>Africa</td>
<td>2</td>
<td>0.93</td>
<td>0.08</td>
<td>0.79</td>
<td>1.09</td>
<td>5.50</td>
<td>81.82%</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>4</td>
<td>0.50</td>
<td>0.11</td>
<td>0.30</td>
<td>0.71</td>
<td>64.48</td>
<td>95.50%</td>
<td></td>
</tr>
<tr>
<td><strong>Developmental Stage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Childhood</td>
<td>20</td>
<td>0.39</td>
<td>0.05</td>
<td>0.30</td>
<td>0.47</td>
<td>177.92</td>
<td>89.90%</td>
<td></td>
</tr>
<tr>
<td>Early adolescence</td>
<td>17</td>
<td>0.65</td>
<td>0.13</td>
<td>0.40</td>
<td>0.91</td>
<td>4268.92</td>
<td>99.40%</td>
<td></td>
</tr>
<tr>
<td>Late adolescence</td>
<td>17</td>
<td>0.55</td>
<td>0.03</td>
<td>0.49</td>
<td>0.61</td>
<td>114.16</td>
<td>84.77%</td>
<td></td>
</tr>
<tr>
<td>Late Adulthood</td>
<td>13</td>
<td>0.62</td>
<td>0.06</td>
<td>0.51</td>
<td>0.74</td>
<td>444.67</td>
<td>97.52%</td>
<td></td>
</tr>
</tbody>
</table>

**Level of Education**

The context of the educational level predictor included six categories: elementary, secondary, junior high, senior high, college, and others. As shown in Table 4, studies conducted in the context of educational level such as elementary school (d=0.39, se=0.05), secondary school (d=0.74, se=0.16), junior high school, (d=0.33, se=0.17), senior high school (d=0.70, se=0.11), college (d=0.59, se=0.04), and others (d=0.56, se=0.4) were found to have significantly measurable effect sizes. Secondary school and senior high school had strong positive effects. The college and others had a moderate positive effect size. Only elementary and junior high schools showed a weak effect size. Heterogeneity for the subgroup of education level (QB = 1376.40, p > 0.05) did not indicate statistically significant differences between the groups. In other words, the level of education was not a moderator that could explain all the population variance in effect size.

**The context of geographical regions**

The context of geographical regions predictor included eight categories: Southeast Asia, East Asia, West Asia, South Asia, Southern Europe, South-eastern Europe, North America, Africa, and others. As shown in Table 4, studies carried out in the context of geographical regions such as Southeast Asia (d=0.58, se=0.04), East Asia (d=0.55, se=0.05), West Asia, (d=1.37, se=0.34), South Asia (d=0.66, se=0.23), Southern Europe (d=0.52, se=0.04), South-eastern (d=0.52, se=0.11), North America (d=0.37, se=0.04),...
Africa (d=0.93, se=0.08) were found significantly quantifiable effect sizes. Table 4, the context of geographical regions had a moderate positive effect. The heterogeneity of the subgroup in the context of geographical regions (QB = 3690.46, p < 0.001) indicated a statistically significant difference. The context of geographical regions was a moderator that could explain all the population variance in effect size.

Developmental stage
The predictor of developmental stages included four categories: childhood, early adolescence, late adolescence, and late adulthood. Table 4, studies carried out with respect to developmental stage categories such as childhood (d=0.39, se=0.05), early adolescence (d=0.65, se=0.13), late adolescence (d=0.55, se=0.03), late adulthood (d=0.62, se=0.06) were found to have no significant quantifiable effect sizes. As shown in Table 4, early adolescence, late adolescence, and late adulthood employees had a moderate positive effect. Only childhood had low positive effects. The heterogeneity for the subgroup of level of education (QB = 74.81, p > 0.05) did not indicate statistically significant differences between the developmental stage groups. It was not a moderator that could explain all of the population variance in the effect size.

DISCUSSION
In the discussion section, it is essential to explain the relationship between self-efficacy, engagement, and various factors that influence academic engagement. Previous studies have found that self-efficacy plays an important role in predicting student engagement (Azila-Gbettor et al., 2021; Chang & Chien, 2015; Olivier et al., 2019). Furthermore, the impact of self-efficacy on work engagement has been explored in different contexts, such as team work (Burić & Macuka, 2018), nursing (Pérez-Fuentes et al., 2019), and the power sector (Rai et al., 2022).

Several mediating factors have been identified in the relationship between self-efficacy and engagement. For example, teacher-student relationships and proactive personality have been found to mediate the link between self-efficacy and academic engagement (Chen et al., 2021; Li et al., 2020). Furthermore, academic emotions and self-regulation have been shown to influence engagement in learning contexts (Doo & Bonk, 2020; Putarek & Pavlin-Bernardi, 2020).

The role of self-efficacy in relation to other variables, such as locus of control and social presence, has been investigated in studies like Hopkins et al. (2020) and Kuo et al. (2021). Furthermore, research has explored the connection between self-efficacy and academic performance in various educational settings, including mathematics (Abu-Hilal & Al Abed, 2019a; Ozkal, 2019) and statistics (Gopal et al., 2018).

Some studies have also examined the influence of external factors on the relationship between self-efficacy and engagement, such as the role of school climate (Pali & Hitipeuw, 2020; Vidi, 2021), academic support (Robayo-Tamayo et al., 2020), and parent-child relationships (Shao & Kang, 2022). The impact of emotional support from teachers on academic performance has been found to be mediated by self-efficacy and engagement in mathematics (Yang et al., 2021). A comprehensive understanding of the
interaction between self-efficacy, engagement, and various factors is crucial to enhance academic performance in various educational contexts. This discussion highlights the importance of fostering self-efficacy and engagement, as well as addressing potential mediating factors and external influences, in order to promote student success.

The researchers performed a moderator analysis to see whether the association between SE and AE is influenced by education level, geographical region, and developmental stage. The correlation did not differ significantly between the level of education and the context of the developmental stage. However, in geographical context regions, the correlation is significantly different. Geographical regions moderate the relationship between SE and academic engagement.

The first results imply that education levels do not moderate the association between SE and academic engagement. However, the correlation between SE and AE is stronger in secondary and high schools than in elementary schools. This finding is thought to be because students at the high school level have a mastery experience and the experience of seeing the success of others (vicarious experiences) is higher than that of students at the elementary school level. This is in line with the opinion (Bandura, 1997b; Gebauer et al., 2019), which states that SE is influenced by the experience of success, the experience of others, verbal/social persuasion, and emotional and physiological states. So, it can be understood that the relationship between SE and AE in junior high school and high school students is greater than at the elementary school level.

The most interesting results of the first study are that the link between the SE and the university level is weaker or not as strong as at the high school level. Ideally, subjects at the college level should have the most robust relationship compared to subjects at other levels of education because they have experience of success and experience of seeing the success of others higher than subjects at the high school level. These findings suggest that past experiences do not automatically affect self-efficacy. Or, in other words, successful experiences do not always affect SE and academic engagement. Previous studies have shown that academic SE is based not only on past experiences but also on personal resources, such as expectations and perceptions about the availability of external resources, such as social support (Ben-Naim et al., 2017; Brouwer et al., 2016). The findings (Jang et al., 2016) show that teacher support is related to academic SE and engagement. The previous study revealed that parental autonomy motivation significantly affects AE through SE (Moë et al., 2018; Pérez-Fuentes et al., 2019). Li et al. (2020) found that teacher autonomy support is related to student engagement through self-efficacy.

The most significant sources of mastery experience are the individual’s experiences and evaluations of the success or failure of a particular task or action (Gebauer et al., 2019). Furthermore, often obtained easily, success will generally not affect the increase in self-efficacy. However, only the success obtained through various obstacles is tremendous and is a self-champion success that can affect the improvement of self-efficacy. SE will also not have much effect if the observed model does not have similarities or differences. Some actions or behaviours may differ from those observed (Olsson et al., 2016). Another reason why subjects at the college level have a lower level of SE than
subjects at the high school level is probably because the demands and challenges in higher education are more numerous and heavier than the demands and challenges at the high school level. For example, subjects in universities taking strata 1, generally aged 18-25 years from a developmental perspective, can be categorised as an emerging adulthood phase (Arnett, 2000). Emerging adulthood is neither a developmental stage nor an early adulthood (Squires et al., 2018). Emerging adulthood is the stage of life that undergoes the most dynamic and complex changes on a personal, social, emotional, neuroanatomical, and developmental level (Wood et al., 2017a). Therefore, this phase can be a very positive development phase for making choices and explorations, as well as a challenge with the requirements of a more excellent educational and social role. Even for Wood, it is said that the success of conquering challenges in the emerging adulthood phase will have a significant effect throughout the development span of adulthood (Wood et al., 2017b). This condition can affect the affective and physiological needs of subjects at the college level. This is due to physiological and affective states that can affect SE caused by stress, emotions, mood, pain, and fatigue (Sharma & Nasa, 2014).

In addition to the reasons mentioned above, subjects at the secondary school education level are likely to receive more support from parents than subjects at the college level. This is supported by findings showing that families with parents involved in their children's educational activities can guide and facilitate mastery experiences and improve the academic SE of their children (Schunk & Mullen, 2012; Olivier et al., 2019). The involvement of parents in children's educational or academic activities will generally decrease with the increasing level of their education. According to this, parents can foster their children's academic SE by serving as role models and offering persuasive support. Additionally, the role of the teacher or teacher is a factor that affects academic self-efficacy. According to research results, Banfield (2009), the negative behaviour of teachers in the classroom affects students' SE negatively.

The second finding, geographic regions, was found to moderate the relationship between SE and academic engagement. This indicates cultural disparities in the relationship between self-efficacy, academic engagement, and other variables. These findings support previously reached Salanova et al. (2005), which showed that Spanish students indicated better levels of SE and strength in AE than Belgian students. The findings of Mesurado et al. (2016b) showed that Argentine students have higher SE and AE scores than Filipino students. In addition, it supports the results of Zusho et al. (2005) and Eaton & Dembo (1997), which show differences in SE in Asian and American students, where Asian students have higher collective self-efficacy. In comparison, American students have higher individual self-efficacy. This is because the individual cultures that make up the belief system can change from culture to culture Klassen (2004) and the existence of mutual influences of regions and genders on SE belief (Ismayilova & M. Klassen, 2019).

These findings are in line with the opinion (Bandura, 1994), which states that although SE comes from four primary sources Britner & Pajares (2006) and Dilekli & Tezci (2020), these four primary sources of SE vary across cultures (Bandura, 2002). SE
might differ from country to country and culture to culture. Therefore, it can be said that the role of regions as moderators of the relationship between SE and AE is due to cultural differences in this study. Traditionally, culture is classified as individualistic and collectivist. Collectivist cultures generally emphasise the needs, values, goals, perspectives, and social welfare of groups (collectivism).

In contrast, individualistic societies promote personal goals, attitudes, and values, not group members (individualism). Individualistic societies focus more on individuals and nuclear families, whereas collectivistic cultures emphasise hierarchies (Levine et al., 2001). Children in collectivist cultural systems get feedback on how performance in their group and on their performance, whereas in individualist systems, children only get feedback on their performance. There are different academic SE based on race and ethnicity (American and non-American such as Latino, Asian American, and African American) (Wang & Castaeda-Sound, 2008). This difference in academic SE occurs due to differences in perceptions of the support of parents and friends. Those who feel that they have the support of parents and friends have better academic SE obtained from the subjects of American students. In contrast, those who perceive that parents and friends provide less support will have a low academic SE obtained from non-American student subjects.

The third finding is that stages of development do not moderate the relationship between SE and academic engagement. These findings contradict the results of Gärtner & Hertel (2020), which show that the age of workers moderates SE with efforts in teams to perform unfamiliar or new tasks. However, there is no moderation effect on familiar tasks, which is consistent with our assumption that more substantial situational demands (Meyer et al., 2010; Mischel, 1999). These findings support the role of subjective age moderators in the relationship, while they do not support the position of SE moderators. These findings underscore that workers who actively manage their perceptions of personal age can age successfully in the workplace (Meyer et al., 2010).

CONCLUSIONS

The results indicated that the mean impact size value was a high impact level. SE had a significant impact on academic engagement. The effect of SE on AE differs depending on the potential moderator variables. The results showed that educational levels have different effects. Studies in primary, secondary, and college revealed significant quantifiable impacts. Colleges and others have a medium positive effect. Only elementary and junior high schools showed weak effects. The level of education is not a moderator that can explain all variants of the population in different measures of impact. The effect of SE on AE differs significantly according to geographical regions. The predictor of geographical regions of context included eight categories: Southeast Asia, East Asia, West Asia, South Asia, Southern Europe, South-East Europe, North America, Africa, and others. Studies conducted in the context of geographical regions were found to have significantly quantifiable effect sizes. The context of geographical regions had a moderate positive effect. The context of geographical regions was a moderator that could explain all the population variance in the different effect sizes. The developmental stages included four categories: childhood, early adolescence, late adolescence, and late
adulthood have different effect sizes. The developmental stage, such as childhood, early adolescence, late adolescence, and late adulthood, does not have significantly quantifiable effect sizes. Early adolescence, late adolescence, and late adulthood employees had a moderate positive effect. Childhood had low positive effects. The developmental stage did not indicate a statistically significant difference. The developmental stage was not a moderator that could explain the entire population in effect size. Addressing weak effects in elementary and junior high schools to improve the impact of SE on AE at these educational levels, educators can incorporate self-efficacy building activities into the curriculum, such as goal setting, self-assessment, and feedback. Furthermore, creating a supportive learning environment that encourages autonomy and resilience will promote a stronger sense of self-efficacy among younger students.

**RECOMMENDATIONS**

Expand the scope of potential moderator variables: Further research should explore additional moderator variables, such as socioeconomic status, parental participation, or school climate, to gain a more comprehensive understanding of the relationship between SE and AE.

Longitudinal studies: Longitudinal research designs could provide valuable information on the causal relationship between SE and AE, as well as the long-term impact of interventions on self-efficacy and academic engagement.

**LIMITATIONS**

Causality: The present study cannot establish causal relationships between SE and AE due to its nature. Future research should employ experimental designs to better understand causality.

Generalisability: The study findings may not be generalisable to other populations or contexts due to inherent biases or limitations in the sample.

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