

FACTORS INFLUENCING ACADEMIC ENGAGEMENT OF UNIVERSITY STUDENTS: A META-ANALYSIS STUDY

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Abstract

Education is the life-wire of every nation. But there is a general outcry that the standards of education are falling and morals flagging in many parts of the world. As a solution for ineffectiveness of education, many educators described that the intended outcomes can be made through academic engagement. In order to know whether the academic engagement actually works in the enhancement of education sector, the present study analyzed the relative strengths of the associations between academic engagement and internal and external factors by meta-analysis approach. First of all, the researcher searched the literature via different search engines_ Google, Google Scholar, PsycINFO, and Academia using the keywords_ factors influencing/ affecting academic engagement, determiners of academic engagement, and predictors of academic engagement. After screening 153 studies, 23 studies with combined sample size ranging from 91 to 2368 participants, which met all the required criteria were identified. For reporting meta-analyses, PRISMA statements were followed. According to meta-analysis results, academic self-efficacy, academic satisfaction, academic performance, motivation, and valuing were found to be the related internal factors which influence academic engagement. And gender, lecturers' teaching styles and grade were also found as related external factors. In addition, it was found that motivation was the strongest internal factor influencing academic engagement. As engagement plays an important role in the academic setting of university students, they all need to possess a relatively high level of academic engagement. The findings of the present study will provide the various influencing factors of academic engagement aiming to be a good support for enhancing an essential factor of education sector.

Keywords: Academic Engagement, Meta-analysis, PIASMA, Internal Factors, External Factors

Introduction

Numerous factors have been pointed out for the ineffectiveness of education. It is not sapient to say that these conditions may be entirely due to structural and or administrative ineptitude. Among many factors that influence education, educators have been considered engagement as a means for producing effective education. The term engagement is more than involvement or participation- it requires feelings and sense making as well as activity (Harper & Quaye, 2009). In order to ascertain both sense and activity, we need to make sure that our students are being engaged in their academic settings.

Engagement increases the odds that any student will attain his or her educational and personal objectives. It makes students acquire the skills and competencies demanded by the challenges of the twenty-first century, and enjoy the intellectual and monetary advantages associated with the completion of the baccalaureate degree (Kuh, 2009). Being an important indicator for cultivating intellectualized graduates, engagement should be mentioned in academic settings.

Educators described that the intended outcomes can be made through academic engagement. Kahu (2013) stated that knowledge, skill and competences learned or achieved through academic engagement can be considered as proximal academic outcomes rather than academic engagement in studying. Further distal academic outcomes include individual students' retention in universities, employment success and lifelong learning (Kahu, 2013).

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Academic engagement is often linked with good learning outcomes (Fredricks et al., 2004). For example, high levels of academic engagement were associated with academic outcomes, such as university persistence (Hughes & Pace, 2003) and grade point average (GPA) (Carini et al., 2002). As we aim to result good educational outcomes, students need to possess a certain level of engagement to their academic settings.

So, academic engagement is an important issue in the enhancement of education sector in many countries. All of its characteristics and dimensions create a satisfactory atmosphere for teaching learning process. This study aims to concentrate on this issue as a way to solve the problem of failure in education.

Related Literature Review

Concept of Academic Engagement

The role of engagement in understanding students' educational trajectories and outcomes emerged as a topic of interest and importance in recent decades. Much of the theoretical and empirical work that currently exists stems from Alexander Astin (1984).

According to Astin (1984), "student involvement refers to the quantity and quality of the physical and psychological energy that students invest in the college experiences. His student involvement theory focuses solely on the motivation and behavior of the students at a university. As students become more engaged, academically and socially, students feel a greater attachment to the institution and become satisfied with their experiences. Academic engagement can also be understood as "a measure of student involvement with university studies" (Horstmanshoff & Zimitat, 2007), which encourages students to develop "a deeper understanding of their university work" (Horstmanshoff & Zimitat, 2007).

Another perspective indicates that engagement occurs when "students take advantage of the range of learning opportunities their institutions provide outside the classroom" (Reason, Terenzini & Domingo, 2006). Furthermore, Kuh, Cruce, Shoup, and Kinzie (2008) define academic engagement as "the time and energy students invest in educationally purposeful activities". The benefits of students' engagement, as well as factors that impact engagement, are now highlighted to provide an overview of the engagement literature.

The level, type, and frequency of engagement has been shown to impact several educational outcomes, including retention and persistence (Pascarella & Terenzini, 2005; Horstmanshof & Zimitat, 2007), as well as "growth in academic competence" (Reason, Terenzini & Domingo, 2006, p. 171). Horstmanshof & Zimitat (2007) found that students oriented towards future goals, such as careers after college, resulted in "an increase in the level of students' engagement with their studies, and potentially, an increased likelihood that they would continue with their studies long-term". In this sense, engagement is a critical component to students' persistence in college.

Factors that Affect Student Engagement

According to previous studies, factors that impact students' academic engagement, and by extension, their learning and persistence in college, include contact with people different than themselves (Pascarella & Terenzini, 2005; Reason, Terenzini & Domingo, 2006); being oriented towards the future (Horstmanshof & Zimitat, 2007); faculty (Umbach & Wawrzynski, 2005); and race/ethnicity (Johnson, Crosnoe & Elder, 2001). Pike & Kuh (2005) also found that academic

engagement was influenced by being female, having graduate or professional-school aspirations, and residing on the college campus.

Meta-analysis Approach

Nowadays, there has already been a great number of research which examined factors influencing academic engagement. However, the resulted factors for each study may be different in accordance with the intention of the researcher. Individual studies addressing academic engagement in research are available, but a synthesis of results in this area has to date needs to be undertaken. For these reasons, it is necessary to find the various related factors of academic engagement through meta-analysis approach.

Meta-analysis, a quantitative approach, is a statistical analysis that combines the results of independent observations into an average effect size and draws an overall conclusion regarding the direction and magnitude of real-world effects. To accomplish its purpose, a meta-analysis requires a thorough search of the relevant studies, and the results of each individual study have to be translated into the same metric (Cooper, 1998; Lipsey & Wilson, 2001).

In general, the statistical analysis usually applied in meta-analysis has three main objectives: (a) to estimate the overall effect size of the population to which the studies pertain; (b) to assess if the heterogeneity found among the effect estimates can be explained by chance alone or if, on the contrary, the individual studies exhibited true heterogeneity, that is, variability produced by real differences among the population effect sizes; and, (c) if heterogeneity cannot be explained by sampling error alone, to search for study characteristics that could operate as moderator variables of the effect estimates.

The outcome of a meta-analysis is a weighted mean effect size which reflects the population effect size more accurately than any of the individual estimates.

Advantages of Meta-analysis are

- Results can be generalized to a larger population,
- The precision and accuracy of estimates can be improved as more data is used,
- Inconsistency of results across studies can be quantified and analyzed,
- Hypothesis testing can be applied to summary estimates
- Moderators can be included to explain variation between studies,
- The presence of publication bias can be investigated.

Meta-analytic Measures

Effect Size: An effect size is a value which describes the result of a treatment revealed in a comparison between groups or degree of association between two related variables. Depending on such study characteristics as the design type and how the variables implied were measured, the meta-analyst has to select one of the different effect-size indices and apply it to all of the studies of the meta-analysis (Grissom & Kim, 2005). So, when the dependent variable is continuous and the purpose of each study is to compare the performance between two groups, the standardized mean difference is the most usual effect size index (Cooper, 1998; Hedges & Olkin, 1985). If the dependent variable is dichotomous or has been dichotomized, then effect-size

indices such as an odds ratio (or its log transformation), a risk ratio (or its log transformation), or a risk difference can be applied (Egger, Smith, & Altman, 2001; Haddock, Rindskopf, & Shadish, 1998; Sa'nchez-Meca, Mari'n-Mart'inez, & Chaco'n-Moscoco, 2003). If all of the variables are continuous, then an effect-size index from the r family can be applied, such as the Pearson correlation coefficient or its Fisher's Z transformation (Hunter & Schmidt, 2004; Rosenthal, 1991; Rosenthal, Rosnow, & Rubin, 2000). The two main families of effect are differences between groups (also known the d family) and measures of association (also known as the r family). It can be computed for each study and then the work with the effect sizes to assess the consistency of the effect across studies and to compute a summary effect. Effect size is the prevailing unit in a meta-analysis.

Forest Plot: A forest plot, also known as a blobbogram, is a graphical display of estimated results from a number of scientific studies addressing the same question, along with the overall results. Each horizontal line on a forest plot represents an individual study with the result plotted as a box and the 95% confidence interval of the result displayed as the line. The implication of each study falling on one side of the vertical line or the other depends on the statistic being used. If the individual study crosses the vertical line, it means the null value lies within the 95% confidence interval. This implies the study result is in fact the null value and therefore the study did not observe a statistically significant difference between the treatment and control groups. The bullet at the bottom of the forest plot shows the result when all the individual studies are combined together and averaged. The horizontal points of the bullet are the limits of the 95% confidence intervals and are subject to the same interpretation as any of the other individual studies on the plot. The I^2 statistic gives an idea of the heterogeneity of the studies, i.e. how consistent they are. If the I^2 value is $>50\%$ it might mean the studies are inconsistent due to a reason other than chance. This might make the conclusions from the forest plot questionable.

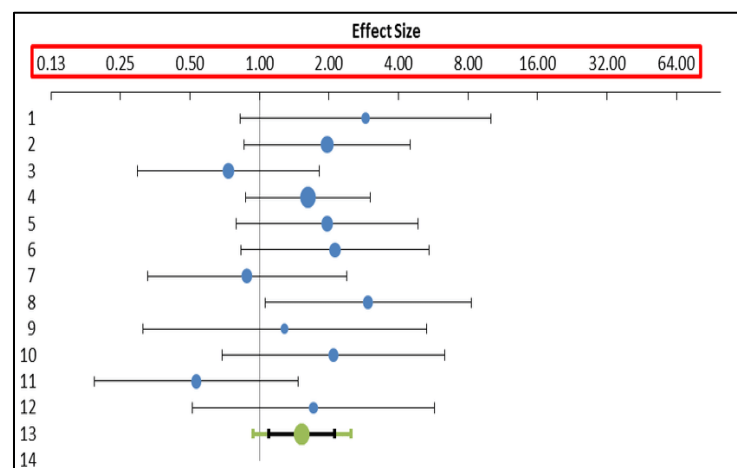


Figure 1 Example of a forest plot in meta-analysis

Confidence Interval: A confidence interval can be defined as a point estimate of a parameter (or an effective size) plus or minus a margin of error. The margin of errors describes the precision of the estimate and depends on the sampling error in the estimate as well as the natural variability in the population (Sullivan, 2007). Sampling error describes the discrepancy between the values in the population and the values observed in the sample. Confidence intervals can be an effective mean of reporting results. They combine information on location and precision and can often be directly used to infer significance levels. They can also be used in hypothesis

testing. If the confidence interval of the combined effect size (a confidence level of 95% and p -value is smaller than .05) does not include zero, the meta-analytic effect is statistically significant. In meta-analysis, presentation of effect statistics and their CIs is mandatory. Familiarization with effect statistics and their CIs encourages not only meta-analytic thinking but also 'effective' thinking. The combination of effect sizes and CIs can reveal what p values cannot show (i.e., uncertainty of effect, direction of effect, and magnitude of effect). The approach of using effect sizes and their CIs allows effective statistical inference from data, offering a better understanding and characterization of the results.

Objectives of the Study

The main aim of the study was to examine the internal and external factors influencing academic engagement of university students. The specific objectives were

- (1) To study the most useful instruments for academic engagement,
- (2) To inquire which of the internal and external factors are the most strongly correlated with academic engagement of university students by meta-analysis approach.

Methodology

Steps in Meta-analysis

The steps in a meta-analytic process are: (1) collecting the studies, (2) coding the studies, (3) calculating a mean effect size, (4) computing the statistical significance of the mean (5) examining the variability in the distribution of effect size estimates, and (6) interpreting the results.

(1) Collecting the Articles

Firstly, several databases were searched using multiple search engines, including Google, Google Scholar, PsycInfo and Academia. Primarily, the following combinations of keywords were entered into the search engines: factors affecting academic engagement, factors influencing academic engagement, predictors of academic engagement; determinants of academic engagement; and related factors of academic engagement. Once academic engagement-focused references were obtained, each publication's reference list was also examined for other publications.

(2) Selecting the Studies

A total of (1557) studies were initially found. Masters and doctoral dissertations were also included in this review. After removing (1122) duplicated records, the titles and abstracts of the (435) articles remained to be screened. And then (281) studies were found not to be concerned with the present study. Thus, (154) sources were identified for reviewing according to different criteria.

Inclusion criteria for the present study were (a) Studies that were written out in English language only (b); Studies for both male and female university students; (c) Studies that use an acceptable definition of academic engagement; (d) Studies that examine at least one factor of academic engagement of university students; (e) Studies that include usable data (correlation, t -score, d -score or F score) to measure the effect size of academic engagement.

Some studies were excluded because (a) they were reviews of already published research (n=4); (b) they were not published in English (n=14), (c) power point presentation (n=4); (d) no university students (n=82), (e) being not acceptable definition of academic engagement(n=7), (f) did not include at least one affecting factor of academic engagement(n=3); (g) they did not present the statistical data for calculating effect size (n=14), (h) including only one kind of gender (n=3). Therefore, total of 23 studies met the criteria for inclusion in conducting the present meta-analysis.

(3) Coding of Study Variables

Studies were identified and coded by the researcher. Appendix-A shows summary of studies included in this meta-analysis. Then the findings were summarized in the next section.

(4) Measurement of the Distribution of Effect Size

The studies were interpreted by the effect size and the findings were summarized in the next section.

Findings

Characteristics of Participants

Appendix-A summarizes the characteristics of participants in the review. Overall, 23 studies yielded many effect sizes with sample size for each study, ranging from 91 to 2368. Most studies were published in journals and some are unpublished dissertations. All the studies were utilized cross-sectional designs. Moreover, the participants from these studies were of mixed socioeconomic status.

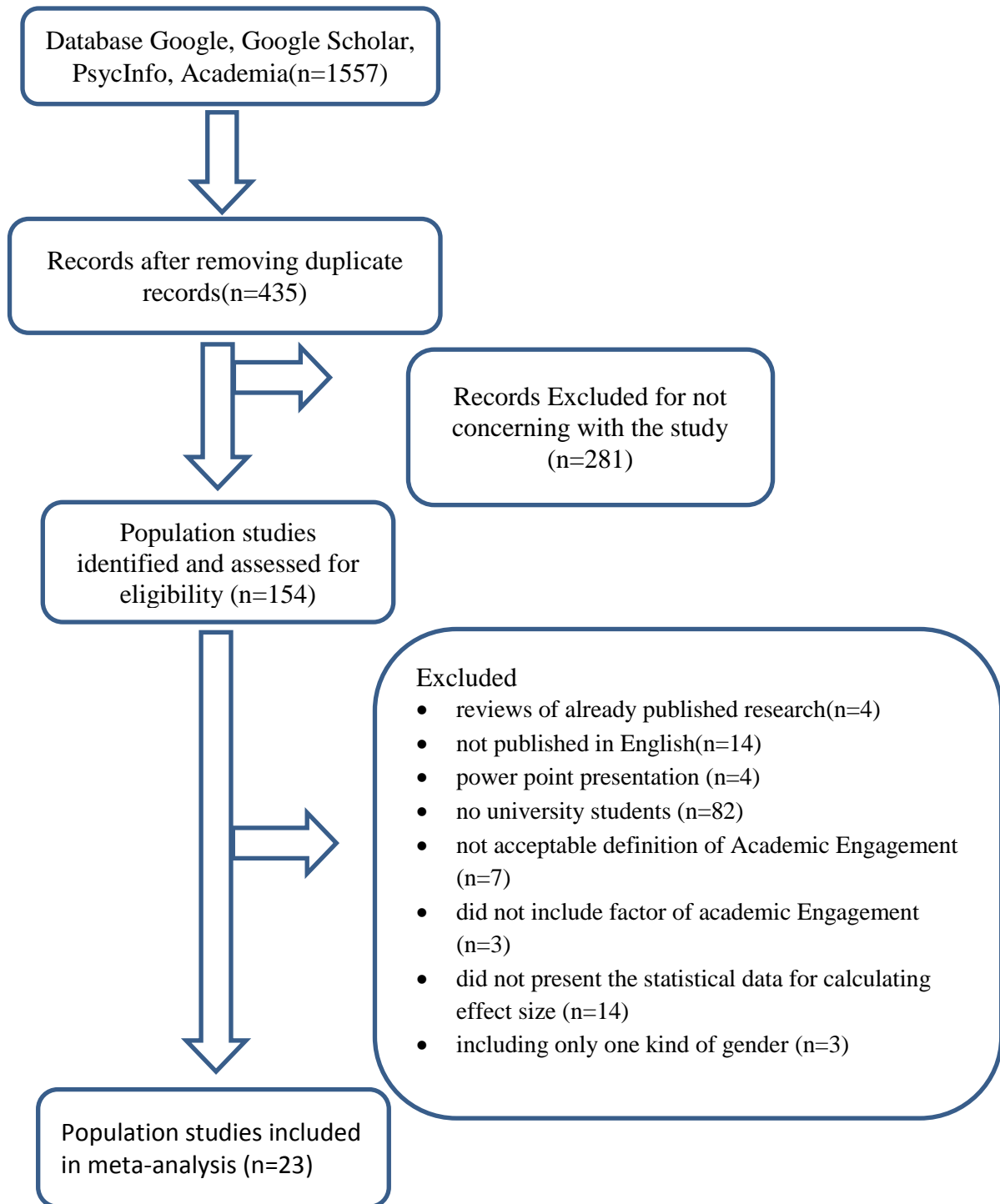


Figure 1 The PRISMA Flow Diagram for Selecting the Required Studies

Most Useful Instruments for Academic Engagement

Various instruments of academic engagement were found in different studies. In the present studies, 6 inventories were found the most to be used for measuring academic engagement of university students. Among the 23 studies used in this meta-analysis, the National Survey on student engagement (NSSE) was found to be the most frequently used (n=7). The National Survey of Student Engagement (NSSE) is an ongoing research campaign in the USA

used to assess the extent to which colleges and universities are participating in educational practices that are strongly associated with high levels of learning and personal development.

The benchmarks include: level of academic challenge, active and collaborative learning, student interactions with faculty members, enriching educational experiences, and supportive campus environment. A composite score for each benchmark is calculated that averages each student's answers to the questions related to that benchmark.

The main content of the questionnaire is related to the behavior of students which has high correlation with good learning outcomes and learning practice such as feedback on exams, assignments, and the use of educational resources. Each item is answered through four statements ranging from 1 -never to 4 -always.

Student Engagement Scale (SES) is a five-point Likert scale make up of 6 factors with 41 items.

UWES-S (Schaufeli, Salavona, et al., 2002) is a 14-item scale that is made up of three subscales, namely; vigour (5 items), dedication (5 items) and absorption (4 items).

Student Course Engagement Questionnaire (SCEQ) is a five point Likert type scale made up of 4 dimensions: Skills engagement, participation/interaction engagement, emotional engagement, performance engagement.

Student Academic Engagement (Schaufeli et al., 2002) has 17 items for assessing the three dimensions of the construct: vigour (6 items), dedication (5 items), and absorption (6 items). The items were scored on a 4-point Likert scale from 1 (totally disagree) to 4 (totally agree). Higher scores on the three dimensions reflect stronger levels of engagement.

Factors Influencing Academic Engagement

According to the meta-analysis result, some related internal factors and external factors were shown in Table 1 and Table 2 respectively. Among factors, optimism, loyalty intention, sense of belonging, locus of control, sense of place, self-efficacy, academic satisfaction, academic performance, motivation and valuing are most significant internal factors and gender, lecturer's teaching style, grade and leave intention are found as related external factors.

Table 1 Meta-analytic result on internal factors influencing academic engagement

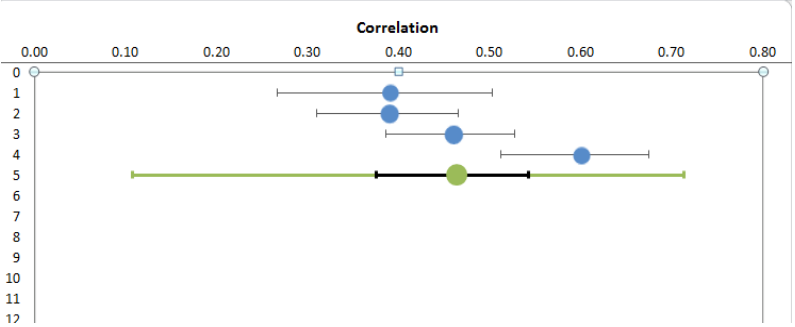
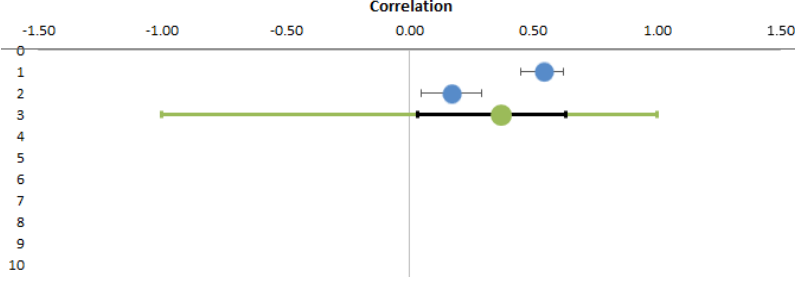
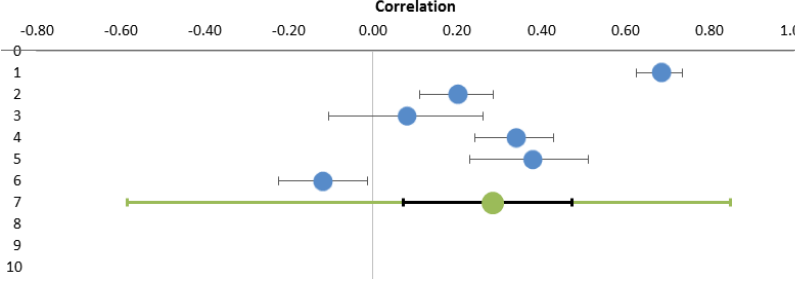
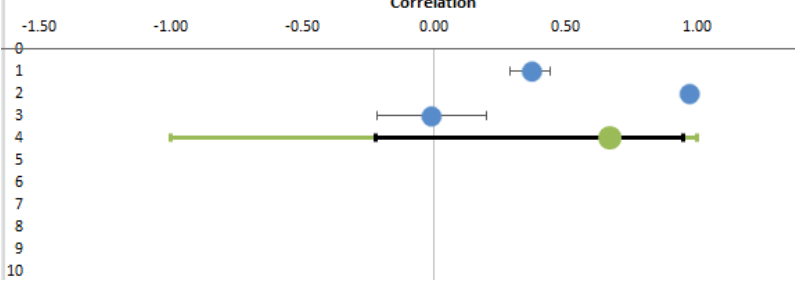
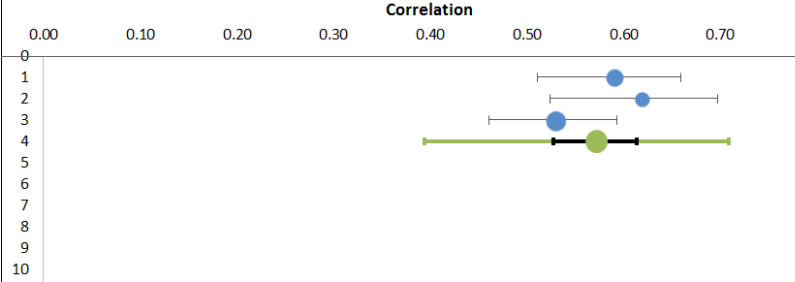
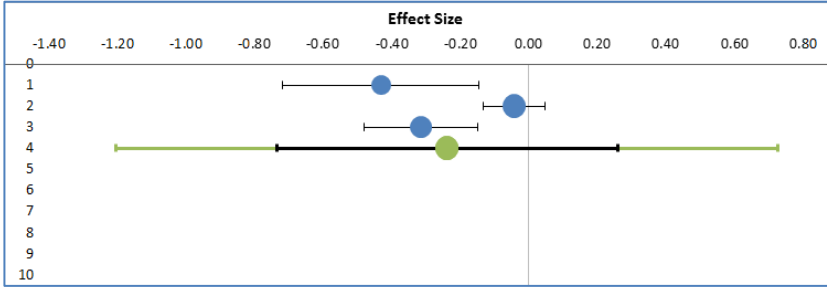
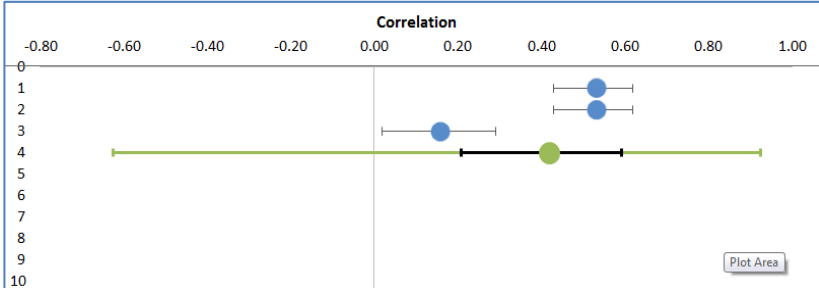
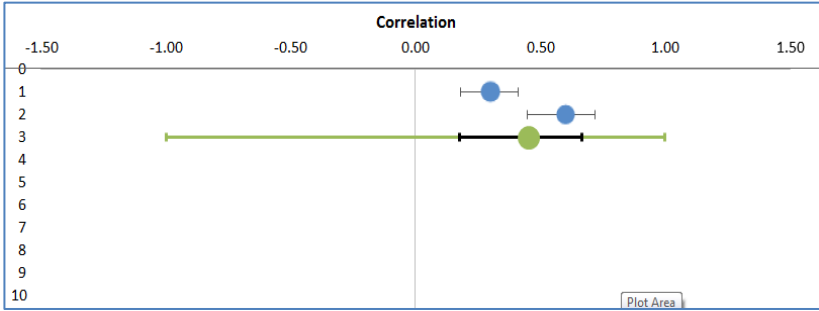
Factors	Effect Sizes and Forest Plots
<p>Self-Efficacy and Academic Engagement</p>	 <p>r=0.46 , 95% CI= [0.38, 0.54], p=0.000</p>
<p>Academic Satisfaction and Academic Engagement</p>	 <p>r=0.37, 95% CI= [0.03,0.63], p=0.036</p>
<p>Academic Performance and Academic Engagement</p>	 <p>r=0.29, 95% CI= [0.07,0.47], p=0.014</p>
<p>Motivation and Academic Engagement</p>	 <p>r=0.67, 95% CI= [-0.22,0.95], p=0.098</p>
<p>Valuing and Academic Engagement</p>	 <p>r=0.57, 95% CI= [0.53,0.61], p=0.000</p>

Table 2 Meta-analytic Result on External Factors Influencing Academic Engagement

Factors	Effect Sizes and Forest Plots
<p>gender and Academic Engagement</p>	 <p>Hedge's $g=-0.24$, 95% CI= $[-0.74,0.26]$, $p=0.02$</p>
<p>lecturer's teaching style and Academic Engagement</p>	 <p>$r=0.42$, 95% CI= $[0.21,0.59]$, $p=0.001$</p>
<p>grade and Academic Engagement</p>	 <p>$r=0.46$, 95% CI= $[0.18,0.67]$, $p=0.005$</p>

Analysis on Internal and External Factors of Academic Engagement

All the data were analyzed by using Meta-Essentials (Excel workbook) software. And the variables were classified as internal or external factors.

Estimation of Internal Factors

In Appendix B, the average weighted effect size statistics for 17 related internal factors of academic engagement were presented.

Among the internal factors, optimism($r=0.75$), loyalty intention($r=0.73$), sense of belonging($r=0.77$), motivation($r=0.67$) were the strongest internal factors, with very large effect sizes according to Cohen (1988). Although the effect size analysis showed that motivation was a strong significant factor for academic engagement, it had heterogeneous effect. And then, valuing ($r=0.57$), emotional competence ($r=0.52$), and meta-cognition ($r=0.53$) were also found as the

significant internal factors for academic engagement with large effect sizes. Among them, valuing had a homogeneous effect.

Moreover, self-efficacy and academic satisfaction were also internal factors with medium to large range of effect ($r=0.46$ and $r=0.37$ respectively). Academic performance ($r=0.29$) was also an internal factor with medium effect size.

Estimation of External Factors

The weighted average correlations and homogeneity analysis for the eight external factors were shown in Appendix-C.

Among the external factors, grade ($r= 0.46$) and lecturers' teaching styles ($r= 0.42$) were the strongest external factors of academic engagement with Cohen's medium to large range of effect size. Gender and leave intention were also found as significant external factors of academic engagement with medium effect sizes.

The last four factors_ academic obstacles, academic facilitators, perceived autonomy support and type of college were also significant external factors of academic engagement, but with small effect sizes. Among them, gender and lecturers' teaching styles had heterogeneous effects.

Discussion

This meta-analytic study found that 1) optimism, 2) loyalty intention, 3) sense of belonging, 4) motivation, 5) valuing, 6) meta-cognition, 7) self-efficacy, 8) locus of control and 9) sense of place were the most significant internal factors which influenced the academic engagement of university students. For improving academic engagement of university students, the administrators, educators and staffs should emphasize the importance of these internal factors and find ways and activities to cultivate these mechanisms.

Moreover, 1) grade, 2) lecturer's teaching styles 3) gender and 4) leave intention were found as the greatest external factors of academic engagement. Although gender and grade cannot be controlled, we can improve the academic engagement of university students through appropriate teaching styles and systematic leave intention.

Thus, nurturing and cultivating of internal mechanisms of students, using positive programs and creating a reflexive teaching learning environment may be a support for the improvement of university students' academic engagement.

Conclusion

This study presented and quantified the relationship between internal and external factors and academic engagement. The results from 23 studies with combined sample size ranging from 91 to 2368 subjects, with 11318 in total participants. According to the meta-analytic results, various related factors of academic engagement were found. And, some most useful instruments and types of participants could also be defined. But the present study did not include moderator analyses. Providing the basic information on the development of academic engagement in higher education, the current study will be a good support in organizing education system and for producing effective education.

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APPENDIX A- Summary of Studies Included in Meta-Analysis

No	Researcher (Date)	Country status	N	Level of Study	Engagement Measure
1	Maria & Cazan(2014)	2	202	1	2
2	Olpak, Korucu (2016)	2	194	1	3
3	Shaari, Yusoff, Ghazali, Osman & Dzahir (2016)	2	226	1	1
4	Sarwar & Ashrafi (2014)	2	369	2	1
5	Friedman (2014)	2	351	1	2
6	LeMay IV (2017)	2	460	3	4
7	Selim (2014)	2	304	1	3
8	Okoli (2013)	3	358	1	1
9	Shaari, Yusoff, Ghazali, Osman (2014)	2	226	1	1
10	Mehdinezhad (2011)	2	1921	1	5
11	Mehdinezhad (2010)	3	336	1	1
12	Durán, Extremera, Rey, Fernández-Berrocal & Montalbán (2006)	3	373	1	3
13	Lee & Anantharaman (2017)	2	270	2	3
14	Snijder (2017)	3	140	1	2
15	Junco (2011)		2368	1	1
16	Ashkzari, Piryaei & Kamelifar (2017)	2	480	1	4
17	Nelson (2016)	3	116	1	5
18	Wang & BrckaLorenz(2017)	3	844	2	1
19	Babatunde & Olanrewaju (2012)	2	500	2	3
20	Han, Volkova & Corley (2016)	2	91	2	5
21	Papa (2015)	3	244	1	4
22	Astuti, Sumarwan &Qayim (2016)	2	345	1	1
23	Jomon & John (2017)	2	600	1	5

Note: Country status: 1= Under Developing Country; 2= Developing Country; 3= Developed Country

Level of Study: 1= Undergraduate students; 2= Postgraduate Students; 3= Sophomore Students

Academic Engagement measure: 1=National survey of student engagement (NSSE); 2= the Utrecht work engagement scale for student (UWES-S); 3= Academic engagement scale (AES); 4= Student course engagement Questionnaire (SCEQ); 5= Student engagement scale (SES).

Appendix-B. Internal factors Influencing Academic Engagement

No	Variable	<i>k</i>	<i>r</i>	95% CI	<i>Q_w</i>
1	self-efficacy	4	0.46	[0.38, 0.54]	13.95
2	academic satisfaction	2	0.37	[0.03,0.63]	23.58
3	academic performance	6	0.29	[0.07,0.47]	176.22
4	motivation	3	0.67	[-0.22,0.95]	790.96
5	loyalty intention	1	0.73	-	-
6	locus of control	1	0.434	-	-
7	sense of belonging	1	0.772	-	-
8	sense of place	1	0.43	-	-
9	self-regulation	1	0.38	-	-
10	perceived stress	1	0.18	-	-
11	emotional competence	2	0.516	-	-
12	optimism	1	0.75	-	-
13	valuing	3	0.57	[0.53,0.61]	2.87
14	meta-cognition	1	0.53	-	-
15	action control	1	0.29	-	-
16	future time perception	1	0.16	-	-
17	test anxiety	1	0.208	-	-

Appendix-C. External factors Influencing Academic Engagement

No	Variable	<i>k</i>	<i>r</i>	95%CI	<i>Q_w</i>
1	Gender	3	-0.24	[-0.74, 0.26]	12.60
2	Lecturer's teaching style	3	0.42	[0.21,0.59]	25.54
3	academic obstacles	1	-0.14	-	-
4	grade	2	0.46	[0.18,0.67]	9.41
5	academic facilitators	1	0.20	-	-
6	leave intention	1	-0.30	-	-
7	type of college	1		-	-
8	perceived autonomy support	1	0.18	-	-