# UNDERSTANDING STUDENTS' ENGAGEMENT FOR IMPROVE TEACHING EFFECTIVENESS

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## ABSTRACT

*This study, with the application of Importance-Performance Analysis (IPA) technique, explores college students' classroom engagement, the results of which can be used as the basis for teaching improvement. Research methods adopted in this study are literature review, focus group, and questionnaire survey. This study began with establishing student engagement indicators through the use of literature reviews in order to develop the questionnaire, then the study proceeded with the use of convenience sampling on sophomore students of a certain college, and obtained 70 valid return questionnaires, which were analysed with perception analysis and IPA. The findings of this study show that incorporating behavioural engagement, emotional engagement, cognitive engagement, and agentic engagement indicators in the design of the questionnaire indeed lead to the understanding of students' expectations about teaching; while applying IPA does help in obtaining the key criteria for teaching improvement. The contribution of this study is that the indicators derived from this study are helpful in verifying student engagement, the questionnaire is effective in assessing student engagement, and IPA is appropriate for analysing the status of student engagement, leading to clarity in teaching improvement.*

**Keywords:** college teaching, Importance-Performance Analysis, behavioural engagement, emotional engagement, agentic engagement.

## INTRODUCTION

The issue concerning student engagement in the classroom of higher education is the key to teaching and learning outcome, and it is one of the most important topics in present-day research (Alt, 2015; Sinatra, Heddy & Lombardi, 2015 ; Gunuc & Kuzu, 2015). Many researches suggest that the learning of college students is deeply affected by the on- and off-campus environment, so much so, that it is causing concern about the degrading level of student engagement and learning effectiveness (Lee & Reeve, 2012; Azevedo, 2015; Reeve, 2013). It is imperative that we find the solutions to the core issues that affect classroom participation in colleges, so they may serve as the basis for teaching improvement and teaching quality enhancement.

To date, studies conducted on student engagement at the college level may be divided generally in to three major research directions: One is the use of the qualitative research approach. For example, the study conducted by Holley & Oliver (2010) adopted the Phenomenological approach to research student engagement; the research of Fredricks, Blumenfeld, & Paris, 2004 was conducted with objective observation of classroom learning

activities or events; and the study of Skinner, Kindermann, & Furrer, 2009 was conducted using teachers' estimations of students' behavioural engagement and emotional engagement. Two is the use of the measurement approach, with the help of instrument or tools, to observe activity at the micro-level. For example: Miller (2015) measured cognitive engagement using reading time and eye movement; while Broughton, Sinatra, & Reynolds (2010) completed a series of self-paced studies. Three is the use of the survey evaluation approach. For example: the survey study of student engagement(Reeve, 2013; Zepke, Leach, & Butler, 2014); and the surveys of college student engagement conducted by dedicated institutions, including: 1. National Survey of Student Engagement, NSSE (NSSE, 2016); 2. College Student Experiences Questionnaire, CSEQ (CSEQ, 2016); 3. Community College Survey of Student Engagement, CCSSE (CCSSE, 2016); and 4. Australasian Survey of Student Engagement, AUSSE (AUSSE, 2016).

The rapid expansion of higher education in Taiwan in the last two decades may have satisfied public demands for increasing the spectrum of higher education, but it has also caused concerns that teaching quality and student performance are below public expectations. The root cause is related to student engagement (Zhang, 2012). It is true that past research concerning teaching effectiveness was usually conducted from the perspective of students' learning satisfaction, with little regard given to including student engagement as one of the variables that affects teaching effectiveness. Teaching and learning are interdependent. If the research is to understand and analyse classroom teaching in order to make improvements, then focus should be placed on indicators of student engagement. Therefore, using the survey evaluation approach, this study aims to explore college students' classroom engagement using the application of importance-Performance Analysis (IPA), the results of which may be used as the basis for teaching improvement. The research framework of this study began with theoretic exploration. The literature review helped in defining measurement indicators of student engagement and in the development of research tools. Then, focus group discussions and a survey research were conducted, with the help of IPA, to obtain core issues for teaching improvement.

## LITERATURE REVIEW

### Theoretical Background

Service quality may be deemed as the difference between customer expectations and perceptions of service performance (Lee et al., 2010). In the implementation of curriculum of a school, students are the customers of a teacher, and teaching quality is the core issue (Bonstingl, 1992). The Expectancy Theory and the Adaptation Theory may serve to describe a student's expectation of the teaching quality of a class. According to the Expectancy Theory, a teacher is expected to execute a teaching task with appropriate teaching behaviour to avoid incurring criticism and unexpected behavioural outcomes, while implementing a curriculum (Chang, 2014; Williams, 2006). Deming (1993) suggested that education should make reference to the principles of quality management. He claimed that the same principles that apply to quality management should apply to education reform and education management in order to achieve teaching process improvement. In adaptation theory, the relationship between students' expectation and perceived teaching performance is suggested as: if the performance of the teaching target is higher than the adaptation level of students' perception, then the result is a positive evaluation; conversely, a negative evaluation. Oliver (1997) proposed a perception model on cause and effect of satisfaction, specifically relating to customers' perceived adaptation level. This model demonstrates the evolutionary steps of how customers follow their expectations and purchase attitudes prior to buying a product or a service, and subsequently manifest the purchase intention. The earliest expectation has a



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direct impact on the satisfaction level after the purchase. In the Expectancy Theory and the Adaptation Theory, when a student purchases a course, he evidently becomes the customer, and is directly impacting the levels of classroom learning engagement and teaching satisfaction.

The term, engagement, is one of the most widely used and overgeneralized constructs found in the educational, learning, and psychological sciences (Azevedo, 2015). "Engagement" is confirmed to closely correlate to students' positive learning outcomes, both on and off campus (Sinatra, Heddy & Lombardi, 2015). The so-called "engagement" refers to the active participation in asking question, having dialogs, taking part in interaction, in addition to offering evaluations or strategies during a learning activity (BBC, 2014). Therefore, this study defines "Engagement" as: The active participation of college students, in that, they exhibit the performance of asking questions, engaging in dialogs and discussions in a course of full-semester study.

**Evaluation Indicators of Engagement**

Engagement on a microlevel may be a moment, a task, or a learning activity of a student; while on a macrolevel, it may be a group of learners in a class, course, school, or community (Sinatra, Heddy & Lombardi, 2015). Azevedo & Flávio (2013) classified the types of engagement indicators as process, product, self-reports and knowledge construction, where the process aspect includes screen recordings, concurrent think-alouds, retrospective think-alouds, eye tracking, log-files, facial expressions of emotions, and physiological sensors. While the product aspect includes pretest- posttest-transfer tests, quizzes, and summaries. The self-reports aspect includes the use of self-report questionnaires. The knowledge construction aspect includes note-taking, drawing and classroom discourse. Using these methods or instruments, four dimensional variables: cognition, metacognition, affect, and motivation may be applied as verification of the various research results obtained.

Among various assessment indicators used for college student engagement, "enriching educational experiences" is the common indicator in NSSE, 2016 and AUSSE, 2016. After further aggregation, the component items of the enriching educational experiences indicator may include: learning communities, service learning, participating in faculty research projects, co-op, internship, and culminating senior experience. In terms of the assessment on student engagement in the classroom, it may be measured with four indicators: behavioural engagement, emotional engagement, cognitive engagement and agentic engagement (Lee & Reeve, 2012; Reeve, 2013).

Summarizing the above, the core issue of this study is in the teaching improvement of a course, and the indicators of student engagement, operational definitions and questionnaire items, as adopted in this study, are shown in Table 1.

**Table 1. Assessment indicators, operational definitions, and questionnaire items of college student engagement**

| Indicator | Operational Definition | Item |
|---|---|---|
| Behavioural Engagement | In the classroom learning process, the student behaviour exhibited in group discussions and learning concentration. | (1) In classroom group discussions, I volunteer as the group leader to lead the discussion.<br>(2) In class, I ask myself to concentrate.<br>(3) Even when I encounter |

| | | |
|---|---|---|
| | | difficulties, I still work hard to learn. |
| Emotional Engagement | The level of pleasant feelings exhibited as students are absorbed in the learning environment. | (4) It's interesting to be in class.<br>(5) My curiosity is stirred continuously in class.<br>(6) I often feel pleased in class. |
| Cognitive Engagement | The extent of students' pursuit of academic challenges as exhibited in classroom learning activities. | (7) I can quickly grasp the ideas about the course content I am learning.<br>(8) I will attempt to point out the best way to complete the assignment.<br>(9) I not only get the correct answers, I also know why. |
| Agentic Engagement | In the classroom teaching process, students have constructive contributions. | (10) I ask questions in class.<br>(11) I express my opinions in class.<br>(12) I offer suggestions on how to have better learning outcomes in class. |

## METHODOLOGY

### Focus Group

First, four engagement indicators were confirmed as the evaluation indicators for college student engagement by experts in focus group meetings and through the process of literature review; then a draft of the IPA questionnaire was developed. Each meeting included 3-5 scholars to discuss and revise the questionnaire content. A total of three meetings were convened to enhance the expert content validity.

### Survey Research

*Research Tool Development:* The structure of the questionnaire comprises basic information, the importance of student engagement (12 items), and the performance of student engagement (12 items). Questionnaire items were compiled in accordance with the operational definition of the student engagement and the behaviour that should be exhibited within the context of four indicators. The five point Likert Scale is adopted to score each item (1=not important, 5=very important).

*Data Collection:* Using the course "project planning" of the information department of a technical university as the research scope, this study adopted convenience sampling, and implemented the survey in the last week of the semester. Each tester completed two different questionnaires, which were collected right after they were completed.

*Data Analysis:* IPA, as proposed by Martilla & James (1977) is adopted for data analysis in this study. The method is used to measure the importance and the performance of attributes in order to develop effective strategies for improvement. IPA is a research technique that involves using the consumer measurement on product importance and performance in order to rank the attribute priority for specific products or services (Sampson & Showalter, 1999; Chang, 2014; Chang, 2013). When the importance of the attribute is high and its performance is also high, the attribute falls under "Keep up the good work" quadrant. Additionally, an ISO-rating line (through the original point, a line is drawn at 45 degree angle) is used as the



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determining gauge: attributes with both importance and performance levels that reach "concentrate here" and "keep up the good work" are above this line; conversely, attributes below this line require improvement. Therefore, the purpose of using IPA is to understand the student engagement in the class, and to examine the inadequacy of its engagement and performance attributes, as shown in Fig. 1.

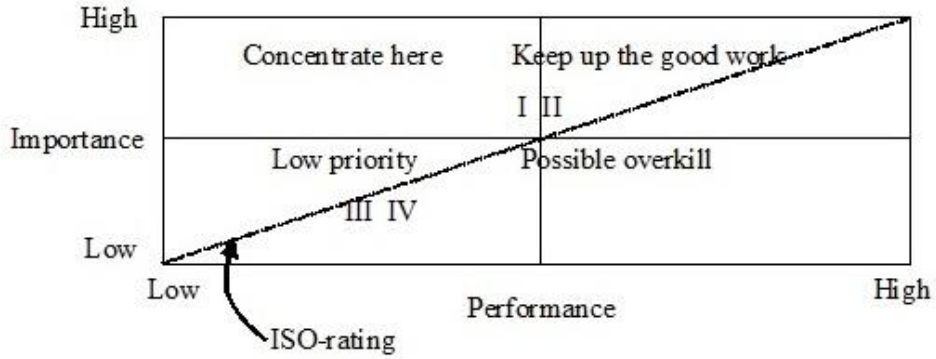


Figure 1. I-P map

Resource: Martilla & James (1997).

## RESULTS AND DISCUSSION

### Statistical Analysis

A total of 72 copies of the questionnaire were issued. Apart from two invalid copies, there were 70 copies of valid questionnaires collected, a return rate of 97.22%. The mean of student engagement importance and the mean of student engagement performance are shown in Table 5. Concerning the validity of the questionnaire, the focus of items a1~d12 is on the importance of student engagement, and their overall questionnaire validity: Cronbach's Alpha=.917; where the validity of each item is between 0.904~0.918. Items p1~s10 are the measurement of student engagement performance, and their overall questionnaire validity: Cronbach's Alpha=.933; where the validity of each item is between 0.923~0.936, all reaching an outstanding standard.

### Significance Test on the Differences of Means

Since each test subject answered both the importance and the performance questionnaires, Paired Samples Statistics was adopted to verify the significance on the differences of means of both questionnaires. The results show that the correlation of paired samples, r=0.869, p<0.001, reach significance level. Mean deviation of Performance Mean (x) and Importance Mean (y), t=6.283, df=11, p<0.001, reach the significance level, showing that Importance Mean of student engagement is significantly higher than Performance Mean, as shown in Table 2. That is, students agree with questions listed under student engagement indicators, but their self-assessment shows that they can not reach the ideal level of engagement.

**Table 2. Paired Samples t-test**

| Variables | Mean | N | Std. Deviation | t (2-tailed) |
|---|---|---|---|---|
| Performance Mean (X) | 3.67 | 12 | .18715 | 6.283*** |
| Importance Mean (Y) | 3.84 | 12 | .17286 | |

***p<0.001

### Analysis of Students' Perception

The Paired Samples t-test method was adopted to test the correlation between students' expectations and perceptions. The results show that, in the correlation of importance and performance, nine items: 1, 3, 4, 6, 7, 8, 9, 10, 11, out of the 12 items, r=0.304~0.536, reach significance level, as shown in Table 3.

In the analysis of perceptions, items 6, 8, 9, 11 reach significance level, as shown in Table 4. That is, indicator importance is significantly higher than performance, showing that students' expectations are not satisfied. The teaching relating to these 4 items requires improvement:

- (6) I often feel pleased in class. (emotional engagement)
- (8) I will attempt to point out the best way to complete the assignment. (cognitive engagement)
- (9) I not only get the correct answers, I also know why. (cognitive engagement)
- (11) I express my opinions in class. (Agentic engagement)

Whereas, there is no significant difference in items 1, 2, 3, 4, 5, 7, 10, 12, showing that importance and performance of indicators are highly consistent, and that students' expectation is satisfied.

**Table 3. Samples correlation between students' expectation and perception**

| Indicator | Pair items | Correlation |
|---|---|---|
| Behavioural engagement | Pair 1 | .392** |
| | Pair 3 | .536*** |
| Emotional engagement | Pair 4 | .342** |
| | Pair 6 | .470*** |
| Cognitive engagement | Pair 7 | .313** |
| | Pair 8 | .409*** |
| | Pair 9 | .477*** |
| Agentic engagement | Pair 10 | .304* |
| | Pair 11 | .529*** |

**p<0.01, ***p<0.001

**Table 4. Paired samples t-Test of students' perception analysis**

| Item | | Paired Data | | | | | T | df | Significance (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Standard Deviation | Standard Error Mean | 95% Confidence Interval | | | | |
| | | | | | Lower Limit | Upper Limit | | | |
| Paired Items 6 | b6 - q6 | .357 | .799 | .096 | .167 | .548 | 3.739*** | 69 | .000 |
| Paired Items 8 | c8 - r8 | .214 | .883 | .106 | .004 | .425 | 2.031* | 69 | .046 |
| Paired Items 9 | c9 - r9 | .243 | .824 | .099 | .046 | .439 | 2.465* | 69 | .016 |
| Paired Items 11 | d11 - s11 | .286 | .819 | .098 | .090 | .481 | 2.919** | 69 | .005 |

*p<0.05, **p<0.01, ***p<0.001



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## *IPA*

### Importance-Performance Gap of each indicator

Designating X as the Performance Mean of student engagement, Y as the Importance Mean, the gap scores between performance and importance are listed in Table 5.

Table 5. A list of the Importance-Performance Gaps of Each Indicator n=70

| Item | Performance Mean (X) | Importance Mean (Y) | Gap (X-Y) | Plot point |
|---|---|---|---|---|
| 1 | 3.50 | 3.64 | -0.14 | F1 |
| 2 | 3.81 | 3.96 | -0.15 | F2 |
| 3 | 4.06 | 4.11 | -0.05 | F3 |
| 4 | 3.67 | 3.83 | -0.16 | F4 |
| 5 | 3.69 | 3.79 | -0.1 | F5 |
| 6 | 3.61 | 3.97 | -0.36 | F6 |
| 7 | 3.74 | 3.83 | -0.09 | F7 |
| 8 | 3.80 | 4.01 | -0.21 | F8 |
| 9 | 3.74 | 3.99 | -0.25 | F9 |
| 10 | 3.51 | 3.67 | -0.16 | F10 |
| 11 | 3.34 | 3.63 | -0.29 | F11 |
| 12 | 3.53 | 3.60 | -0.07 | F12 |
| Overall Mean | 3.67 | 3.84 | | |

### IPA Map

By referencing the analysis methods of Martilla & James (1977), Ainin & Hisham(2008), Duke & Mount (1996), an IPA map of student engagement is plotted as Fig. 2. The plotting steps are as follows:

1. Designate X as the Performance Mean of student engagement, Y as the Importance Mean, and obtain the base coordinate (x, y).
2. Determine the coordinate distribution of 1-12 items by using performance mean and importance mean of student engagement of each question item.
3. Using ISO-rating line to gauge the priority of each item.

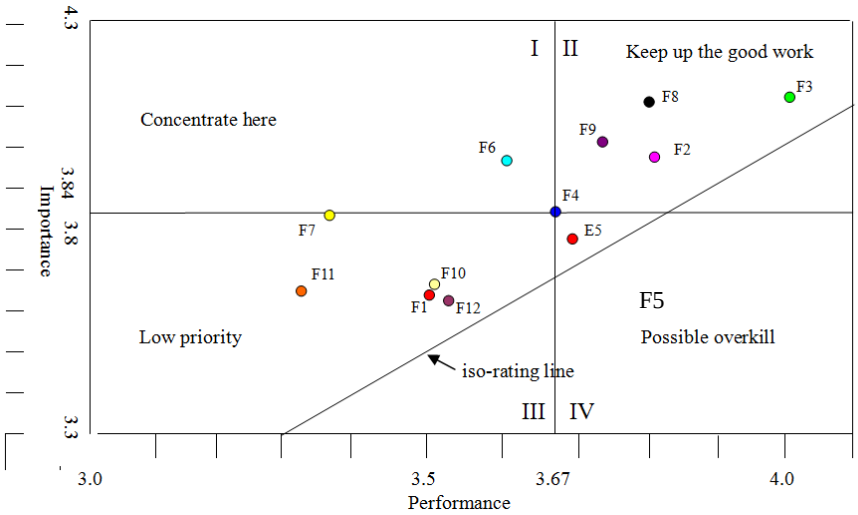


Figure 2. IPA map of student engagement

A. Only item 6 falls into "Concentrate here" quadrant, i.e. "I often feel pleased in class. "

B. Items 2, 3, 8, 9 fall into "keep up the good work" quadrant, i.e.:

Behavioural Engagement: 2. In class, I ask myself to concentrate.

3. Even when I encounter difficulties, I still work hard to learn.

Cognitive Engagement: 8. I will attempt to point out the best way to complete the assignment.

9. I not only get the correct answers, I also know why.

C. Items 1,7, 10, 11, 12 fall into "low priority" quadrant, i.e.:

Behavioural Engagement: 1. In classroom group discussions, I volunteer as the group leader to lead the discussion.

Cognitive Engagement: 7. I can quickly grasp the ideas about the course content I am learning.

Agentic Engagement: 10. I ask questions in class.; 11. I express my opinions in class.; 12. I offer suggestions on how to have better learning outcomes in class.

D. Only item 5 of emotional engagement falls into "possible overkill" quadrant, i.e.: 5. My curiosity is stirred continuously in class.

E. Item 4 of emotional engagement falls into the original point, and it is difficult to determine to what quadrant (I, II, III or IV) it belongs. It is obvious that "It's interesting to be in class" is dependent upon the type of class, instructor and learning environment to have different outcome.

F. Gauging from ISO-rating line, almost all items are distributed within ”concentrate here”, "keep up the good work”, and ”low priority” quadrants, showing that teaching improvement should be completed in a short time.

## DISCUSSION

### It is fitting to verify student engagement with IPA

If a research discussion is only conducted from the perspective of student satisfaction when exploring the effectiveness of teaching, there is often the concern of lacking thoroughness. It is far easier to see the direction of teaching improvement, when incorporating student engagement in the discussion along with the use of IPA. IPA has been extensively applied to a variety of research fields, for example: the research on product or service quality improvement (Lee, Yen, & Tsai, 2008); the relationship between customer expectation, its importance and performance (Wu & Shieh, 2009; Geng & Chu, 2012); an assessment on college students' creativity on special projects (Chang, 2014); and information system analysis (Ainin & Hisham, 2008). Thus, the application of IPA on this study is fitting.

The IPA technique is based on two hypotheses: (1) the attribute relationship between performance and overall customer satisfaction is linear; and (2) both importance and performance attributes are independent variables (Matzler, et al., 2004; Geng, & Chu, 2012; Chang, 2014). According to these two hypotheses, performance and customer satisfaction have an existing linear relationship. In other words, high service (teaching) quality is predictive of high customer (student) satisfaction. If interpreted with the adaptation theory,



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the significance of the dynamic between importance and performance of student engagement indicators represents the satisfaction of an expectation. When applied in this study with the introduction of Expectancy Theory, IPA is used to analyse the measurement of the importance and self-expression as regarded by the school's target customers-students, so as to obtain the priority rating of the attribute of each item. This application is consistent with the research proposed by Martilla & James (1997). The results may offer instructors a precise understanding of their teaching improvements.

**Perception analysis and IPA are complementary**

The analysis results of students' perception and the analysis results of IPA are complementary with each other, specifically on the teaching of the course, Project Planning.

1. The results of perception analysis and IPA are consistent, both showing that emotional engagement (item 6) must be strengthened. Wherein, the results of IPA indicate that further focus is needed on the said emotional engagement. Therefore, the instructor's teaching improvements should be focused on how to facilitate pleasant mood in the teaching environment.
2. In terms of cognitive engagement, results of perception analysis and IPA both show that academic challenges must be continuously strengthened (items 8 and9). Wherein, IPA results indicate that in addition to "keep up the good work", behaviours, such as: the performance in group discussions and concentration in class (items 2 and 3), should also be maintained.
3. In terms of agentic engagement, the results of perception analysis and IPA both show that item 11 (I express my opinions in class) should be a focus. Wherein, perception analysis results indicate that it requires improvement; however, the results of IPA suggest this item is low priority in teaching improvement.
4. In terms of item 11(behavioural engagement), items 4 and 5(emotional engagement), item 7(cognitive engagement), and items 10 and 12(agentic engagement), the results of perception analysis show that student expectation is sufficiently satisfied. While the results of IPA indicate that item 1 is low priority; items 4 and 5 fall into "keep up the good work" and "possible overkill" quadrants; and items 7, 10, and 12 are "low priority" in teaching improvement.

## CONCLUSION

In the implementation of college courses, reviewing how students participate in learning activities may be deemed as one of the most important paths in the pursuit of teaching excellence. Using Expectancy Theory as a guide, this study is conducted from the perspective of student engagement, while adopting the IPA technique to analyse the distribution of student engagement indicators. The findings may serve as a reference for teaching improvement. The research process involves the use of the teaching effectiveness of a course as an example, and the examination of its student engagement status. The results validate that the four indicators: behavioural engagement, cognitive engagement, emotional engagement, and agentic engagement, are effective in the evaluation of the level of student engagement, and that IPA is effective in identifying performance satisfaction of each item of engagement indicators, and that the research findings may supplement the inadequacy of literature review.

In terms of teaching improvement, this study highlights the fact that when students are highly satisfied with a certain course, the four indicators: behavioural engagement, cognitive

engagement, emotional engagement, and agentic engagement, also show high engagement ratings. When the course implementation meets students' expectation, the teaching quality is also high.

Student engagement is closely related to curriculum, methods, assessment, textbooks, teaching aids, teaching equipment, and various other factors of the course. In terms of research limitation, this study only assessed student engagement in the classroom from the perspective of consequentialism, excluding outdoor student engagement. Compared to a more comprehensive questionnaire assessment (i.e. self-assessment, comments from others, teachers, and subordinates), this study only adopted students' self-assessment, excluding teachers and peer reviews, which is in essence identical to students' writing a learning satisfaction review. In addition, the questionnaires were distributed at the end of the semester instead of in the middle of the course presentation, as a result, respondents might not have properly recalled each issue and given inaccurate answers, due to not being engaged in the actual learning environment. This study recommends that when considering student classroom engagement and teaching improvement of any courses, that the four indicators of this study may be adopted, along with the use of IPA, to improve the effectiveness of teaching design and planning.

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