

# Students' Perceptions of Teaching and Learning Practices: A Principal Component Approach

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*Students' attendance and engagement with teaching and learning practices is perceived as a critical element for academic performance. Even with stipulated attendance policies, students still choose not to engage. The study employed a principal component analysis to analyze first- and second-year students' perceptions of the importance of the 12 teaching and learning practices used in the Economics modules. The results showed that first year students perceive lecturer consultation, ADO consultation, and revision classes as the most beneficial practices for their academic performance. Second-year students recognize interactive group learning practices as most beneficial for their academic performance; they also perceive weekly tutorials, PowerPoint lectures, small group tutorials, and revision classes as contributing the most to academic performance. Self-study and e-learning are perceived as the least beneficial by both streams of students. The main conclusion from this study was that first-year students are more likely to be solitary learners and prefer teaching and learning practices that involve one-on-one interaction with the instructor. On the other hand, second-year students tend to be more social learners, preferring teaching and learning practices that are in a group setup. This is a possible explanation of why they do not attend or engage with some teaching and learning practices.*

*L'on considère la fréquentation scolaire et la participation à l'enseignement et aux pratiques d'apprentissage par les étudiants comme des éléments critiques de la performance scolaire. Malgré des politiques prévoyant la fréquentation, les étudiants choisissent de ne pas participer. Cette étude repose sur une analyse en composantes principales pour étudier les perceptions qu'ont les étudiants en 1re et 2e années quant à l'importance des 12 pratiques d'enseignement et d'apprentissage employées dans les modules de leur cours d'économie. Les résultats indiquent que les étudiants de première année perçoivent que la consultation du professeur, la consultation ADO et les cours de révision sont les pratiques dont ils profitent le plus quant à leur rendement académique. Les étudiants en deuxième année considèrent que leur rendement académique profite le plus des pratiques d'apprentissage de groupe interactif, les sessions hebdomadaires d'enseignement dirigé, les cours basés sur les présentations PowerPoint, le tutorat en petits groupes et les cours de révision. Les deux groupes d'étudiants perçoivent l'autoformation et l'apprentissage électronique comme étant les pratiques les moins favorables à leur rendement. La conclusion principale qui découle de cette étude est que les étudiants en première année tendent plus à être des apprenants solitaires et préfèrent les pratiques d'enseignement et d'apprentissage qui impliquent une interaction individuelle avec le professeur. Quant aux étudiants en deuxième année, ils ont davantage tendance à être des apprenants sociaux et préfèrent des stratégies d'apprentissage reposant sur le groupe. Ces résultats pourraient expliquer pourquoi ils s'absentent des cours ou ne participent pas aux pratiques d'enseignement et d'apprentissage.*

High dropout rates due to poor academic performance continue to be a deterring factor in the bid to increase throughput.<sup>2</sup> According to research by Letseka & Maile (2008), 30% of the South African university students registered in the 2000 academic year dropped out in their first year. The dropout rate increased to 47.9% in 2008 and further to 55% in 2015 (Education Summit, 2015). Closely linked to the problem of poor student performance and low throughput is poor student engagement with the teaching and learning practices; examples of pedagogical approaches that result in low levels of student engagement include face-to-face lectures, tutorials, or lecturer consultation. There is evidence that shows that class sizes shrink immensely as the semester progresses (Romer, 1993). The students who perform well are those who record more lecture attendance hours (a proxy for motivation) despite having all learning materials online (Andrietti, 2014; Arulampalam, Naylor, & Smith, 2012; Romer, 1993; Stanca, 2006; Thatcher, Fridjhon, & Cockcroft, 2007).

Teaching and learning activities are two processes which are highly correlated. As such, different teaching practices and active learning engagement in undergraduate curricula are highly recommended for students' academic performance (Ganyaupfu, 2013; Murphy, Gray, Straja & Bogert, 2004; Owston, Lupshenyuk & Wideman, 2011). Regularly, students' reduced academic performance is linked to poor lecture attendance, which in turn is linked to ineffective teaching and learning methods/practices, teacher ineffectiveness in the classroom or an inadequate curriculum, among others (Adunola, 2011; Zulfiquar, 2015;). Alternative teaching and learning practices like online-learning and one-on-one consultations with the lecturer or tutor or an Academic Development Officer are often used to complement the lectures; despite this the students fail to engage with these practices. The question then is, why do students choose not to engage with these teaching practices? The aim of this study was to investigate if first-year and second-year students at a South African university were motivated to engage with the teaching and learning practices used for economics modules by analysing their perceptions of these practices. The study utilized two research questions:

1. Which teaching and learning practices do first- and second-year economics students perceive as contributing the most or/and the least to their academic performance?
2. Do first-year and second-year economics students have similar perceptions of the importance of the teaching and learning practices and their relationship to their academic performance?

A great deal of research has been conducted on the importance of student attendance for academic performance. A literature search revealed that a number of these studies are mainly centred on lecture attendance or tutorial attendance, without much being reported on other important teaching and learning components such as one-on-one consultations or revision classes (Bati, Mandiracioglu, Orgun, & Govsa, 2013; Crede, Roch, & Kieszczynka, 2010; Ganyaupfu, 2013; Mushtaq, 2011; Stanca, 2006). It is possible to assume that the low attendance reported on lectures and tutorials is because students are engaging more with the other teaching and learning practices; in other words, they are substituting the lectures and tutorials with the other practices. However, this assertion can only be made if all teaching and learning practices are analyzed collectively. This study will fill this gap.

### **Teaching and Learning Practices**

The focus of teaching and learning is the knowledge we want our students to acquire and how to

help them achieve that. The teaching and learning process requires the interaction of an instructor and a student with an overall goal of imparting knowledge, with graduation as the final destination. Teaching practices and learning activities are all means to that destination, with assessments (evaluation) being used as check points for measuring student academic performance. Zulfiquar (2015) and Adunola (2011) argue that it is important that teachers be acquainted with numerous teaching practices and/or strategies to ensure students' academic achievement.

Jarnin (2005) in Andala & Ng'umbi (2016) identified three clusters of teaching methods that can be used individually or in combination: these groupings are identified as traditional lecture methods, interactive methods, and group discussion methods. The traditional lecture is the commonly used teaching method, where students sit in front of a teacher and listen as the teacher gives a lecture. Advantages of this method are that it works well in disseminating information quickly, providing a didactic presentation of information, and instructing large groups of students (Andala & Ng'umbi, 2016). However, the traditional lecture method is problematic in that it fails to promote significant learning: students are not engaged and are not accountable for their own learning. The traditional lecture method can be improved by combining it with interactive methods like the use of PowerPoint slides, flash cards, or demonstrations (Andala & Ng'umbi, 2016).

Interactive lectures are believed to increase conceptual understanding and enhance critical thinking skills coupled with promoting higher knowledge retention (Armstrong, 2009, in Andala & Ng'umbi, 2016; Cortright, Collin, & DiCarlos, 2005). In interactive lectures, students are allowed to explore, process, refine, and present information (Andala & Ng'umbi, 2016). Interactive methods can be improved further by complementing them with the group discussion method.

Group discussion is defined as a form of group communication in which the participants share ideas and exchange information on a common topic (Andala & Ng'umbi, 2016). The main advantages of group discussion are that it facilitates the exchange of ideas; develops leadership, teamwork, communication and collaboration skills; helps participants explore existing knowledge; and promotes high level of thinking (Smith et al., 2009; Wehrli & Nyquist, 2003). Although highly recommended, group discussions have potential of degenerating into social conversations, or sometimes yield interpersonal conflicts; thus, this type of learning method requires a high degree of self-discipline from the students (Wehrli & Nyquist, 2003). Interactive and group discussion methods of teaching works well for students with a social learning style. Social learners prefer learning in groups or classes and prefer social activities and group studying mostly in cliques, rather than doing things individually (Pritchard, 2013)

Adding on to the three clusters of teaching methods are the areas of online learning and one-on-one consultations. The 21<sup>st</sup> century has seen the move from traditional methods of teaching—like the use of chalk and board, or “chalk and talk”—to a more technological based approach, which utilizes laptops and screens. Online learning and e-learning have also come into play, offering the convenience and flexibility of anytime-and-anywhere access to resources—although in some instances they are perceived as replacing the face-to-face lecture (Billings-Gagliardi & Mazor, 2007; van Der Mewre, 2011). These teaching methods work best for students with a solitary learning style. Solitary learners prefer to spend time alone and learn alone: they think independently, self-study, spend time with a teacher clarifying information, and dislike learning in groups (Pritchard, 2013)

To increase student academic achievement, it is important to combine academic input with

student input (Stanca, 2010). Student input combines factors that are directly linked to the student as well as individual heterogeneity, such as cognitive traits. How well a student links the two inputs through attendance will be captured in their academic performance. It is for this reason that lecture and tutorial attendance are made compulsory—or in some institutions a minimum attendance is stipulated—to ensure that the students receive the academic input. However, the stipulation does not guarantee good student performance as in most cases, attendance will still vary depending on students' unobservable traits such as ability, effort, learning style, and motivation (Andrietti, 2014; Stanca, 2010).

There is a wide array of research on the contribution of ability to student performance. In some studies, ability is proxied by high school grade, grade point average (GPA), or aptitude test results, which are commonly used when selecting students to be accepted into university (Bugge & Wikan, 2013; Win & Miller, 2005). Literature suggests a positive relationship between ability and academic performance. A positive relationship is also predicted between effort and academic performance (Bugge & Wikan, 2013; Nonis & Hudson, 2010; Stewart, 2008). In these studies, effort is proxied by average number of study hours or study skills, which are all difficult to quantify as they are self-reported and depend on how honest the student is.

Studies that have analyzed the role of student motivation have centred more on extrinsic motivation and less on intrinsic motivation, mainly because of the absence of a universally agreed upon measure of the latter (Akessa & Dhufera, 2015). Intrinsic motivation is defined as the will to succeed, while extrinsic motivation is the external source of motivation including socialization and rewards (Goodman et al., 2011). Previous studies have used subject evaluation, teacher evaluation, social integration, and career orientation as measures of extrinsic motivation; consequently, these measures are very subjective. To measure intrinsic motivation, the proxies used are student engagement, student perceptions, self-efficacy, interest, and effort beliefs (Bakker, Vergel & Kuntze, 2015; Ferrell & Barbera, 2015; Goodman et al., 2011).

Students' perceptions of learning can contribute to their intrinsic motivation, which in turn feeds into their level of effort. According to Goodman et al. (2011), individual perceptions of the reward and the task has a greater impact on the effort exerted in achieving academic performance. Thus, students' perception of the lectures, tutorials, or any other teaching and learning practice used can influence the level of effort they put into engaging with the activity or task. Goodman et al. (2011) in addition to Richardson and Swan (2003) argue that for an individual to be intrinsically motivated he/she needs to experience interest and enjoyment in his/her task, or have positive perceptions of learning, as well as be satisfied with the instructor. Highly intrinsically motivated students will then attend classes regularly leading to better performance in tests and exams (Bakker et al., 2015; Ferrell et al., 2015; Sikhwari, 2007).

## **Study Overview**

### **Teaching and Learning Practices for First- and Second-Year Economics Students**

The target population for the study were the 630 students taking a first-year microeconomics class in 2015 and the 360 students taking a second-year macroeconomics course in the same year. The study was explained to the students who then signed a consent form to acknowledge willingness to participate. The study reviewed the teaching and learning practises used in the first-year microeconomics class and the second-year macroeconomics class in one South African university. These two modules were chosen for analysis because it is the same lecturers who teach the two

streams, and they use the same teaching and learning practices. The use of the same teachers across the two streams allows for the instructor's personalities and qualities to be assumed constant in this analysis. Both modules were taught by more than one instructor due to the large class sizes at the university. At the beginning of the semester, the students were given a course outline with details of topics to be covered, as well as the core textbooks for the course. Test and tutorial dates were included in the course outline, as were the DP<sup>3</sup> requirements and lecture timetable. Lectures were the main teaching tool and were administered in two 45-minute sessions and one 90-minute session every week. To complement the lectures, the students had to attend a 90-minute large group tutorial session every other week, and small group revision sessions before tests. The students could also have one-on-one consultation sessions with the lecturer on appointment, or the Academic Development Officers anytime during the week. Towards the end of the semester, students were given a one-week study break. All the lecture notes, past tests and exam papers, tutorial material, and other additional resources were made available on Moodle<sup>4</sup> and students had 24-hour access to it. The students also had access to the library and a computer lab where they could do self-studying.

### **Methodology**

A questionnaire was administered to students, with the help of enumerators, during several randomly selected lectures to try and capture as many students as possible. Of the 630 students enrolled for the first-year module, 206 participated; however, 60 student responses were eliminated from the analysis because of incomplete information. The analysis used a sample of 149 first year respondents, and 100 out of 360 second-year respondents. The mean age of the sample was 19 for first year students and 21 for second year students. The pass rate for students in the first-year class was 66%, with a class average of 53.25%. For the second-year class, the pass rate was 73.9%, while the class average was 54.26%.

The questionnaire had a five-point Likert scale question which assessed 12 teaching and learning practices (see Appendix). The students had to indicate the extent to which they considered the 12 teaching and learning practices to be helpful or not helpful for their academic performance.

### **Data Analysis**

Descriptive analysis and Principal Component Analysis (PCA) were used to examine the data and reduce the 12 teaching and learning practices into smaller, more manageable clusters. PCA was the analytical method of choice since it extracts linear composites of observed variables without prior assumptions about any underlying casual model—this differentiates it from Factor Analysis (O'Rourke & Hatcher, 2013). This method also allows for variable reduction when we believe that there is some redundancy from some variables being correlated to others. PCA then allows us to reduce the observed variables into a smaller number of principal components that will capture most of the variance in the observed variables (O'Rourke & Hatcher, 2013). The correlation matrixes for first-year and second-year responses in Tables 1 and 2 show small and moderate Pearson correlation coefficients. Although the coefficients are not strong, they are statistically significant at 1% level of significance: as such, there is enough evidence to suggest that a correlation exists in the population. This then justifies the use of PCA as the method to analyze the data in this study.

Prior to undertaking the PCA, the KMO test of sampling adequacy was applied to determine the suitability of the data for such analysis. As a rule of thumb, if the KMO test result is 0.5 or higher, then the data is suitable for PCA (Field, 2009). In this case, first-year student data reported a KMO test statistic of 0.596, while the second-year student data reported 0.699; this makes both data sets suitable for PCA. The Bartlett test of sphericity was also applied to investigate whether there are relationships between the teaching and learning practices. The Bartlett test for the appropriateness of principal component analysis should be statistically significant at p-value less than 0.05 for PCA to be appropriate (Pallant, 2006). The Bartlett test values were statistically significant with a p-value of 0.000 (Chi-Square = 179.77 and df = 66 for the first-year student data, and Chi-Square = 303.462 and df = 66 for second-year data), indicating that the both data sets were suitable for PCA. See Tables 3 and 4.

The Cronbach Test of reliability was considered for both data sets, but due to the nature of the measures, the test was not informative in some instances. Cronbach Alpha is a statistic used as a measure of internal consistency; it determines how closely related a set of items are as a group, and the reliability of the data. The questions on the Likert scale were formative measures showing alternative teaching and learning practices which are not interchangeable. As a result of this, the low Cronbach Alpha values were used to assess the data. According to Diamantopoulos and

Table 1

*Correlation Matrix of First Year Students' Perceptions of Teaching and Learning Practices*

	1. Revision Classes	2. ADO consultation	3. Lecturer consultation	4. 45 minutes lecture	5. PowerPoint lecture	6. Weekly tutorial	7. S-group tutorial	8. moodle	9. 90 minutes lecture	10. Chalk & talk lecture	11. Fortnightly tutorials	12. Self-study
Correlation	1	1.000										
	2	.290	1.000									
	3	.336	.476	1.000								
	4	.010	.054	.016	1.000							
	5	.152	.141	.063	.291	1.000						
	6	.082	.197	.032	.161	.198	1.000					
	7	.186	.150	.101	-.023	.173	.173	1.000				
	8	.165	-.038	.099	.038	.135	-.003	.077	1.000			
	9	-.004	.108	.138	.007	.148	.146	.089	.071	1.000		
	10	.218	.180	.191	-.073	-.024	.020	.118	.085	.137	1.000	
	11	.039	.049	.133	.134	.149	.182	.025	.125	.029	.280	1.000
	12	-.115	.069	.023	.101	.207	.074	.054	.131	-.009	-.088	.166
Significance	2	.000										
	3	.000	.000									
	4	.451	.258	.422								
	5	.032	.043	.223	.000							
	6	.159	.008	.350	.025	.008						
	7	.011	.034	.110	.390	.017	.017					
	8	.022	.324	.115	.324	.051	.483	.176				
	9	.481	.094	.047	.465	.035	.038	.140	.195			
	10	.004	.014	.010	.187	.387	.405	.075	.151	.048		
	11	.318	.276	.053	.051	.035	.013	.381	.064	.362	.000	
	12	.081	.203	.391	.111	.006	.186	.257	.055	.454	.142	.022

Table 2

*Correlation Matrix of Second Year Students' Perceptions of Teaching and Learning Practices*

	1. 45 minutes lecture	2. 90 minutes lecture	3. PowerPoint lecture	4. Chalk & Talk lecture	5. Fortnightly tutorial	6. Weekly tutorial	7. S-Group Tutorial	8. Self-Study	9. Revision Classes	10. ADO Consultation	11. Lecturer consultation	12. Moodle
Correlation	1	1.000										
	2	.189	1.000									
	3	.229	.274	1.000								
	4	.307	.378	.378	1.000							
	5	.317	.279	.278	.394	1.000						
	6	.135	.308	.344	.281	.043	1.000					
	7	.295	.433	.278	.295	.215	.516	1.000				
	8	.336	.084	-.030	-.065	-.014	-.057	-.013	1.000			
	9	.227	.271	.406	.131	.116	.288	.364	.108	1.000		
	10	.253	.290	.284	.300	.069	.416	.433	.040	.374	1.000	
	11	.189	.260	.060	.293	.027	.119	.191	-.073	.232	.626	1.000
	12	.264	.009	.296	.068	.129	.067	.062	.223	.198	.132	.102
Significance	2	.030										
	3	.011	.003									
	4	.001	.000	.000								
	5	.001	.002	.003	.000							
	6	.090	.001	.000	.002	.337						
	7	.001	.000	.003	.001	.016	.000					
	8	.000	.203	.385	.260	.444	.288	.447				
	9	.012	.003	.000	.097	.125	.002	.000	.142			
	10	.006	.002	.002	.001	.247	.000	.000	.347	.000		
	11	.030	.005	.277	.002	.395	.119	.029	.234	.010	.000	
	12	.004	.464	.001	.251	.100	.254	.271	.013	.024	.096	.157

Table 3

*KMO and Bartlett's Test for Contributors to Academic Performance for First Year Students*

KMO Measure of Sampling Adequacy		0.596
Bartlett's Test of Sphericity	Approx. Chi-Square	179.77
	Df	66
	Sig.	0.000

Table 4

*KMO and Bartlett's Test for Contributors to Academic Performance for Second Year Students*

KMO Measure of Sampling Adequacy		0.699
Bartlett's Test of Sphericity	Approx. Chi-Square	303.462
	df	66
	Sig.	0.000

Siguaw (2006), low Cronbach Alpha values do not necessarily mean low reliability, but rather that a low internal consistency; similarly, a "high" value for alpha does not imply that the measure is one-dimensional. Diamantopoulos and Siguaw (2006) recommend the reliability evaluation for formative constructs to be based on the assessment of the assumption of no multicollinearity. Variance Inflation Factor (VIF) was used to test for multicollinearity. In this regard, the VIF statistics were less than 1.8, suggesting no multicollinearity.

## **Results**

### **Descriptive Analysis of Student Perceptions**

Figure 1 summarizes the data from first-year student respondents, and shows that a strong response for "helpful" (above 80%) was recorded for revision classes, 45-minute lectures, PowerPoint lectures, and small group tutorials. Of the four, the revision classes (89%) were perceived by students as the most helpful for their learning. Lecturer consultation (72%), weekly tutorials (71%), and self-study (74%) also recorded a high helpful response. A number of the students were not sure about whether fortnightly tutorials were helpful or not, as a "neutral" response made up about 43% of the replies. Further analysis of these teaching and learning practices was done using principal component analysis, and results are reported in the next section.

Figure 2 summarizes the data from second-year student respondents. Second year student respondents reported a very strong response for "helpful" (above 80%) for revision classes (96%), PowerPoint lectures (92%), Moodle (82%), and small group tutorials (80%). Self-study (75%), ADO (66%), and lecturer consultations (71%) also recorded high "helpful" response rates. Of the 12 practices investigated, fortnightly tutorials recorded the lowest appreciation, with only 38% of the respondents finding them helpful.

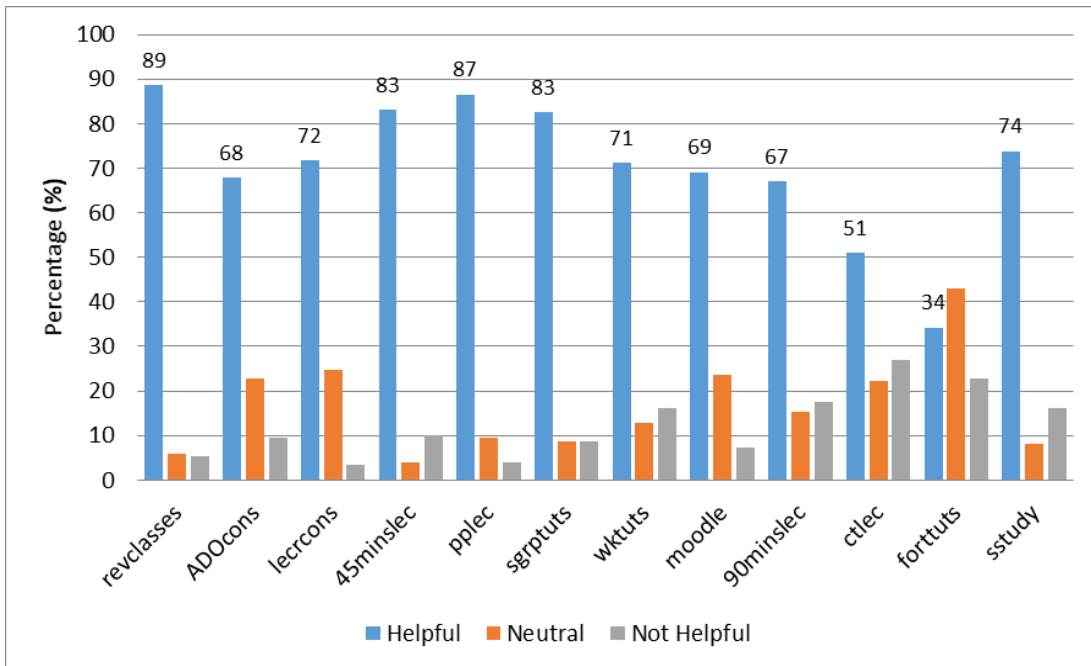
### **Principal Component Analysis of First-Year Students' Perceptions**

Using Kaiser's criterion, a set of five components with Eigen values greater than one emerged from the principal component analysis of first-year students' data (see Tables 5 and 6 and Figure 3). The five components account for 59.342% of the total variance. The first component has an Eigen value of 2.281, and explains 19.006% of the total variance. The component consists of three items, lecturer consultation (factor loading 0.781), ADO consultations (0.774), and revision classes (0.685). The second component has an Eigen value of 1.548, and accounts for 12.9% of the total variance. The third component consists of three items, 45-minute lectures (0.683), PowerPoint lectures (0.62), and self-study (0.59). The third component, which explains 9.748% of the total variance, had three items, 90-minute lectures (0.674), small group tutorials (0.609), and weekly tutorials (0.567). The fourth component accounted for two items, fortnightly tutorials (0.807), and "chalk and talk" lectures (0.691); this explains 8.948% of the total variance. The last component has one element, Moodle (0.827), and represents 8.74% of the total variance.

### **Principal Component Analysis of Second-Year Students' Perceptions**

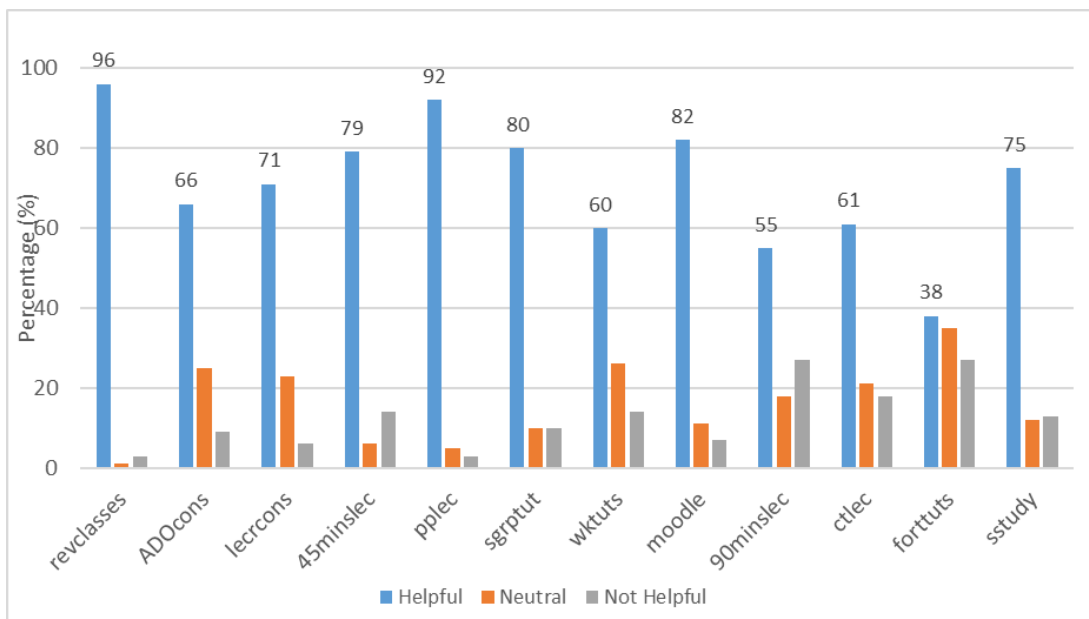
Using Kaiser's criterion, a set of four components with Eigen values greater than one emerged from the principal component analysis of the second-year students' data (See Tables 7 and 8 and





Note: revclasses: revision classes ADOcons: Academic Development Officer Consultations; lecrcons: lecturer consultations; 45minslec: 45-minute lectures; pplec: PowerPoint lectures; sgrptuts: small group tutorials; wktuts: weekly tutorials; moodle: online learning; 90minslec: 90-minute lectures; ctlec: chalk and talk lectures; fortutts: fortnightly tutorials; sstudy: self-study

Figure 1: First Year Economics Students' Perceptions of the Teaching and Learning Practices



Note: revclasses: revision classes ADOcons: Academic Development Officer Consultations; lecrcons: lecturer consultations; 45minslec: 45-minute lectures; pplec: PowerPoint lectures; sgrptut: small group tutorials; wktuts: weekly tutorials; moodle: online learning; 90minslec: 90-minute lectures; ctlec: chalk and talk lectures; fortutts: fortnightly tutorials; sstudy: self-study

Figure 2: Second Year Economics Students' Perceptions of the Teaching and Learning Practices

Table 5

*Total Variance Explained for First Year Students*

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.281	19.006	19.006	2.281	19.006	19.006	1.811	15.096	15.096
2	1.548	12.9	31.906	1.548	12.9	31.906	1.564	13.034	28.13
3	1.17	9.748	41.654	1.17	9.748	41.654	1.336	11.131	39.261
4	1.074	8.948	50.602	1.074	8.948	50.602	1.269	10.578	49.838
5	1.049	8.74	59.342	1.049	8.74	59.342	1.14	9.504	59.342
6	0.966	8.054	67.396						
7	0.942	7.85	75.246						
8	0.762	6.35	81.596						
9	0.657	5.472	87.068						
10	0.598	4.981	92.048						
11	0.528	4.403	96.452						
12	0.426	3.548	100						

Note. Extraction Method: Principal Component Analysis.

Table 6

*Rotated Component Matrix for First Year Students*

	Component				
	1	2	3	4	5
Lecturer Consultation	0.781				
ADO Consultations	0.774				
Revision Classes	0.685				
45-minute Lecture		0.683			
PowerPoint Lecture		0.62			
Self-study		0.59			
90-minute Lecture			0.674		
Small Group Tutorials			0.609		
Weekly Tutorials			0.567		
Fortnightly Tutorials				0.807	
Chalk Talk Lecture				0.691	
Moodle					0.827
Cronbach Alpha	0.632	0.404	0.32	0.434	

Note. Extraction Method: Principal Component Analysis; Rotation Method: Varimax with Kaiser Normalization. <sup>a</sup> Rotation converged in 7 iterations.

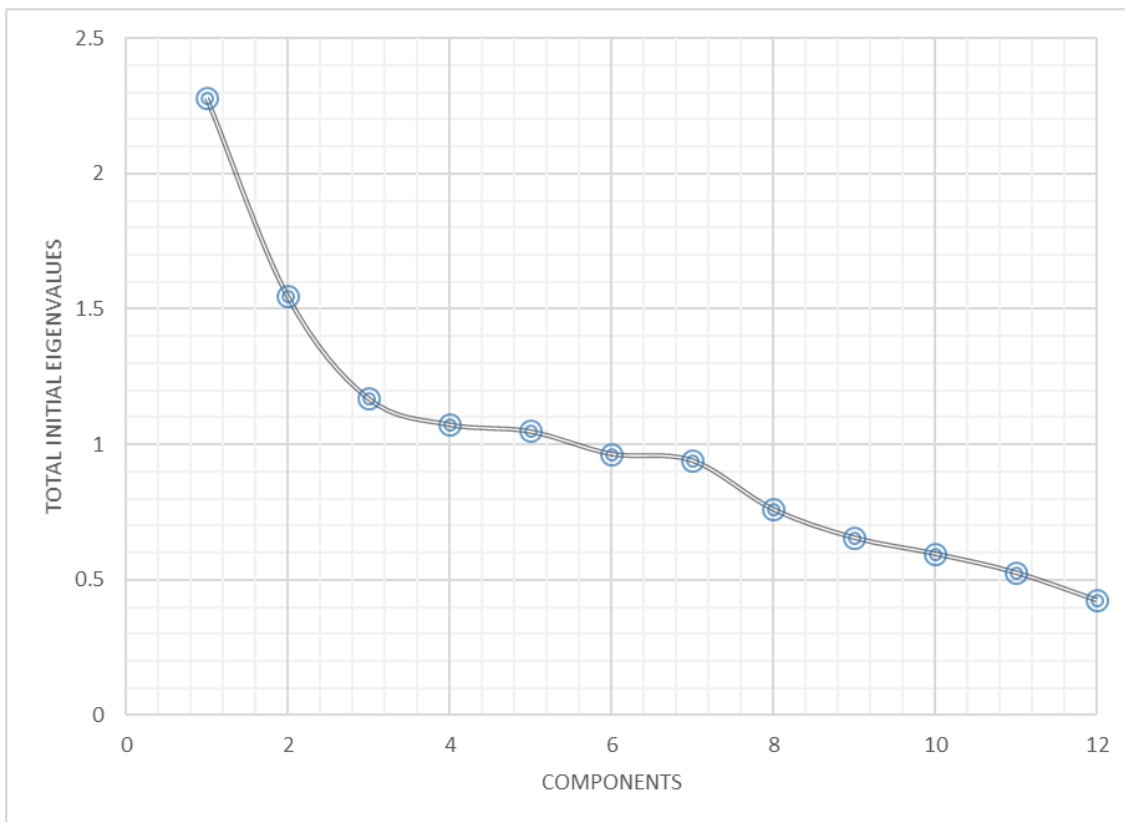


Figure 3: Eigen values for the 12 components generated from the PCA of the first-year students' perceptions of teaching and learning practices

Figure 4). The four components account for 62.533% of the total variance. The first component explained 30.1% of the total variance, and has an Eigen value of 3.615. This component consists of four items, weekly tutorials (0.787), PowerPoint lectures (0.675), small group tutorials (0.642), and revision classes (0.641). The second component has an Eigen value of 1.484 and accounts for 12.4% of the total variance. This component consists of three items, fortnightly tutorials (0.828), chalk and talk lectures (0.738), and 90-minute lectures (0.463). The third component, explains 10.7% of the total variance, and has two items: lecturer consultation (0.916) and ADO consultation (0.758). The fourth component consisted of three items, self-study (0.767), Moodle (0.681), and 45-minute lectures (0.597); this explained 9.3% of the total variance.

## Discussion

The findings of this study are consistent with the literature, which groups teaching styles into five clusters (group discussion, traditional, interactive, online, and one-on-one), and learning styles into two broad clusters (solitary and social learning) (Andala & Ng'umbi, 2016; Pritchard, 2013; Van Der Merwe, 2011). However, it is also apparent that the two streams of students perceive the contribution of these teaching styles to their academic performance differently. From the descriptive analysis, the main finding was that second-year students have a higher appreciation of the different teaching and learning methods compared to first years. This was shown by the higher percentages of responses indicating a teaching and learning practise as "helpful."

Table 7

*Total Variance Explained for Second Year Students*

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.615	30.126	30.126	3.615	30.126	30.126	2.337	19.476	19.476
2	1.484	12.363	42.490	1.484	12.363	42.490	1.869	15.574	35.050
3	1.287	10.726	53.216	1.287	10.726	53.216	1.722	14.347	49.397
4	1.118	9.317	62.533	1.118	9.317	62.533	1.576	13.136	62.533
5	0.987	8.227	70.760						
6	0.741	6.176	76.936						
7	0.659	5.494	82.431						
8	0.607	5.059	87.489						
9	0.463	3.861	91.350						
10	0.417	3.471	94.821						
11	0.383	3.190	98.011						
12	0.239	1.989	100.000						

Note. Extraction Method: Principal Component Analysis.

Table 8

*Rotated Component Matrix for Second Year Students*

	Component			
	1	2	3	4
Weekly Tutorials	.787			
PowerPoint Lecture	.675			
Small Group Tutorials	.642			
Revision Classes	.641			
Fortnightly Tutorials		.828		
Chalk and Talk Lecture		.738		
90-minute Lecture		.463		
Lecturer Consultation			.916	
ADO Consultation			.758	
Self-study				.767
Moodle				.681
45-minute Lecture				.597
Cronbach's Alpha	0.692	0.617	0.765	0.534

Note. Extraction Method: Principal Component Analysis; Rotation Method: Varimax with Kaiser Normalization. <sup>a</sup> Rotation converged in 5 iterations.

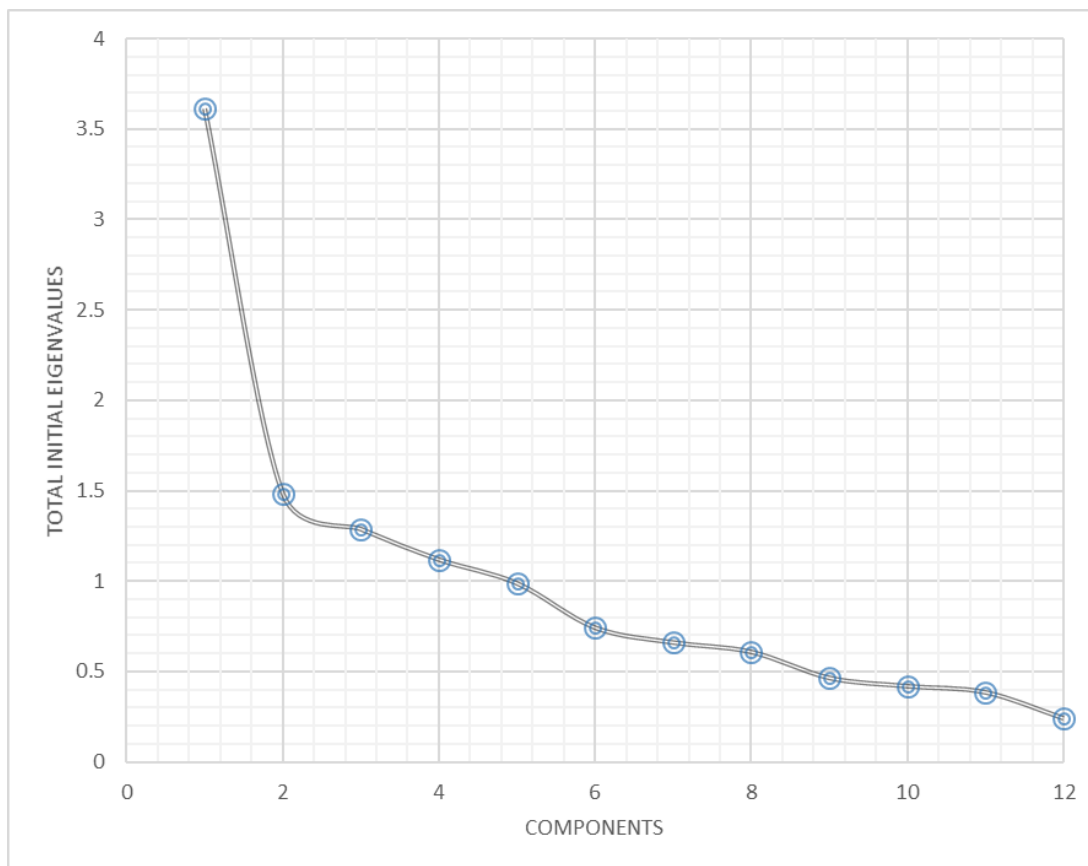


Figure 4: Eigen values for the 12 components generated from the PCA of the second-year students' perceptions of teaching and learning practices

PCA then grouped the teaching and learning practices into clusters. Table 9 gives labels to the derived components from PCA in line with the five teaching styles and two learning styles. The first component for first-year students is labelled “one-on-one” and “solitary learners.” The perceptions of first year students suggests that they are highly motivated to go for one-on-one consultations as they perceive lecturer consultations, ADO consultations, and revision classes to be most helpful to their academic performance. High preference for one-on-one teaching style suggests that the first-year students are more solitary learners (Pritchard, 2013).

The first component for the second- year students is labelled “interactive group discussions” and “social learners.” This cluster includes revision classes, PowerPoint lectures, small group tutorials, and weekly tutorials, which is a mixture of teaching practices that are usually conducted in a group setting. The results suggest that second-year students prefer mostly interactive and group discussion teaching styles, which works for social learners. This is the opposite of first-year students' preference of one-on-one teaching, which works best for solitary learners.

Concurrently, both descriptive analysis and PCA showed that both first- and second-year respondents have a high degree of appreciation for revision classes. Revision classes are usually administered just before a test or exam, and are more structured around reviewing conceptual understanding and enhancing critical thinking in preparation for the exam or test. Revision classes combine group discussion and interactive teaching styles: the literature identifies the two

teaching styles as highly recommended and beneficial for student performance (Andala & Ng'umbi, 2016). This makes the findings consistent with the literature, which encourages use of interactive teaching methods for students' academic success. On the other hand, this result could suggest that the students may possibly be using revision classes to compensate for not attending lectures, or that they rely more on test and exam "spotting" for their academic performance.

On the same note, both streams also indicated high preference for PowerPoint lectures which is also an interactive teaching style. For first-year students, the PowerPoint slides fell into the second component, together with the 45-minute lectures and self-study. The component is labelled "interactive mixed teaching style" for "solitary learners." The PowerPoint lectures provide visually summarized material, which first year students prefer over chalk and talk lectures, a more traditional teaching style: 51% of the first-year students indicated this as their preference, compared to 61% of the students in the second-year class. The high response quantity for the 45-minute lectures by students in the first-year class could suggest that the students know the importance of lecture attendance for their academic performance, although they prefer it in short sessions if possible, since they may have a shorter concentration span.

On the contrary, to the students in the first-year class, the 45-minute lectures and self-study fell into the fourth component for the second-year students. Students in the second-year course preferred lectures 90-minutes in length, which fell into the second component with chalk and talk lectures and fortnightly tutorials. This component is labelled "traditional teaching style" for "social learners." The preference for traditional teaching styles by second-year students may suggest an increased concentration span at the second-year level. It also supports the first components which identifies the students as social learners.

Small group tutorials also recorded high preference from both streams. However, Moodle was picked as the least beneficial by both streams in PCA. This finding suggests that both first- and second-year students have not fully embraced the technological capacities of Moodle. First years also have a disregard for the fortnightly tutorials and chalk and talk lectures. The disdain of the two traditional teaching styles is consistent with literature that labels this teaching style as the least beneficial to academic performance: it fails to promote significant learning especially when used in isolation to other teaching styles (Andala & Ng'umbi, 2016).

In general, first-year students perceive teaching and learning practices associated with social learning as contributing the least to their academic performance; that is, Moodle, fortnightly tutorials and chalk and talk lectures. In contrast, second-year students are least motivated to engage in solitary learning, as they perceive lecturer consultation, ADO consultation, self-studying, and Moodle as less helpful for their academic performance. This is different from first-year perceptions, and is possibly an indication of growth and maturity on the part of the second-year students.

## **Conclusion**

The findings of this study show that both first- and second-year students have a high appreciation of all of teaching and learning practices used by instructors in their economics classes at one South African university. The students perceive these pedagogical practices as important elements for their academic performance, although some are more preferred than others. First-year students perceive one-on-one learning as the most helpful to their academic performance, preferring practices that require a shorter concentration span. They perceive lecturer consultation, ADO consultation, and revision classes as the most beneficial practices for their academic performance,

Table 9

*Classification of the Components*

Component	Teaching and Learning Mode	Teaching Style Label	Learning Style Label
First Year Students			
1	Lecturer Consultation ADO Consultation Revision Classes	One-on-one	Solitary Learners
2	45-minute Lectures PowerPoint Lectures Self-Study	Mixed	Solitary Learners
3	90-minute Lectures Small Group Tutorials Weekly Tutorials	Interactive Group Discussion	Social Learners
4	Fortnightly Tutorials Chalk and Talk lectures	Traditional	Social Learners
5	Moodle	Online	Solitary Learners
Second Year Students			
1	Weekly Tutorials PowerPoint lectures Small Group Tutorials Revision Classes	Interactive Group Discussion	Social Learner
2	Fortnightly Tutorials 90-minute Lectures Chalk and Talk Lectures	Traditional	Social Learner
3	Lecturer Consultation ADO Consultation	One-on-one	Solitary Learner
4	Self-study Solitary Learner Moodle 45-minute Lectures	Mixed	

while online learning was considered the least helpful. Second-year students, in contrast, recognize interactive group learning practices as most beneficial for their academic performance. They perceive weekly tutorials, PowerPoint lectures, small group tutorials, and revision classes as contributing to their academic success. Self-study, Moodle and 45-minute lectures were seen as less beneficial. The main conclusion that can be drawn from this study is that first-years are more solitary learners and prefer teaching and learning practices that involve one-on-one interaction with their instructor. On the other hand, second-year students are more social learners, preferring teaching and learning practices that are in a group setting.

While the results of this work are significant, the study has some limitations. Firstly, the study was restricted to one discipline, Economics, at one university in South Africa. Thus, the findings may not be applicable to other student populations, modules, disciplines, or geographical regions. Secondly, the study is based on self-reported data prior to students receiving their final grades, and does not account for other factors that influence perceptions of learning like teaching quality, learning environment, and workload, among others. For future research, there is need to extend the analysis to a bigger sample, and also account for factors that impact academic performance to ensure a more informed result.

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## Notes

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2 Throughput is generally defined as the number of students who complete their degree in the minimum required time as a fraction of the total initial enrolment.

3 DP requirement stands for Dual Performance requirement which is a minimum average mark (40%) that the student needs to achieve from the continuous assessment in order to be permitted to write the final exam.

4 Moodle, an e-learning tool, is an online service used by the lecturers to communicate with the students.

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**Appendix: Likert Question from the Questionnaire**

1. How would you rate the usefulness/effectiveness of the following teaching and learning practices for your academic performance?

		Not Helpful 1	Somewhat Helpful 2	Not Sure 3	Helpful 4	Very helpful 5
1.	45-minute lectures					
2.	90-minute lectures					
3.	Lectures with PowerPoint presentation					
4.	Chalk and talk lectures					
5.	Fortnightly tutorials					
6.	Weekly tutorial					
7.	Small group tutorials					
8.	Self-studying					
9.	Revision classes					
10.	ADO consultations					
11.	Lecturer consultations					
12.	Moodle					