Global Scientific JOURNALS

GSJ: Volume 9, Issue 8, August 2021, Online: ISSN 2320-9186
www.globalscientificjournal.com

Statistical Analysis of Performance of Outcome Based Education w.s.r. to the BAMS Undergraduates

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Abstract

The examination process is an important aspect of maintaining the quality and standards of a curriculum. It helps to ensure that the final product of a degree programme is up to the standards and is able to cater to the needs of society fulfilling the objectives of the course. Likewise, Ayurveda medical education aims in producing an Ayurvedic physician with more knowledge, better skills and positive attitudes and values to serve as a health care professional. To ensure the examination process is up to the expected standards, a study was carried out using the results of all course units of Semester I End Semester Examinations of four levels of BAMS (Bachelor of Ayurvedic Medicine and Surgery) degree programme carried out at Gampaha Wickramarachchi Ayurveda Institute. The results showed that except for few cases, the examinations are well within the standard.

Key words: BAMS, examination standards, Outcome based education

Introduction

Aim of the Ayurveda medical education is producing an Ayurvedic physician with more knowledgeable, better skilled and having positive attitudes and values to serve as a health care professional. Planning of teaching event and evaluation process to determine to what extent the student have fulfilled the intended competences is a key event. Uncertainty of desired learning outcomes and improper evaluations could lead to pseudo situation in the health care system (Harden, 1999).

Improving higher education student learning plays a very important role in advancing human assets. Assessment lies at the heart of such improvement, emphasizing the need for research and innovation in this field (Melguizo & Coates, 2017). However, there is no generally agreed definition of assessment, and few studies have systematically investigated the meaning of assessment feedback (Evans, 2013). But, methods used to assess students are very important because it affects on how, what, how much, and how effectively a student study (Jimaa, 2011)

Uncertainty about the desired learning outcomes and failure to assess outcomes properly could result in false knowledge, skills and attitudes. Even though the necessary competences,

at the end of their studies, the learners are awarded a certificate that attests to their qualification (Malan, 2010)

As a result of the rigorous exercise of the curriculum development process in Ayurveda medical education, the Outcome-Based Medical Education (OBME) was introduced in Sri Lankan Ayurveda higher education institutes in 2004 onwards. Developing the undergraduate curriculum by identifying the required knowledge and needed skills to perform as a skilful Ayurvedic physician in the health care sector is the significance of the (OBME) in contrast to the traditional Ayurveda medical education. This outcome-based curriculum exhibits the kind of Ayurveda doctor who will be produced at the end of the BAMS degree programme. It also determines the outcomes of the overall BAMS degree programme, teaching methodologies, strategies, learning process, evaluation process, educational environment and, the time frame of the study programme. Additionally, it provides an opportunity to evaluate and revise the curriculum. Even though nine years have passed since the implementation of OBME, no researches related to the teaching, learning, and evaluation processes of this study program has been recorded. Therefore, systematic probing, analyzing, and conducting quantitative and qualitative researches on Outcome Based Ayurveda Medical Education is essential. Conducting quantitative and qualitative research will be beneficial to identify the quality and standard of the academic programme in terms of the impact of teaching, learning and evaluation processes. With this background, a statistical analysis of BAMS undergraduates' performance was carried out under the title "Statistical Analysis of Performance of Outcome-Based Education w.s.r. to the BAMS Undergraduates". To statistically evaluate the performance of the BAMS undergraduates, to discuss the quality and standard of the Evaluation procedures to identify the correlations between student performances in different components of evaluation criteria of course units, to identify possible influences of teaching, learning and evaluation methods on student performances were the objectives of the study. Because

Materials and Method

Permission had been obtained to access and receive the required result sheets from authorized officers of examination. Results of all course units of Semester I End Semester Examinations of level 1,2, 3 and 4 of the academic years 2013/2014, and Level 1, 2, 3, 4 and 5 of 2014/2015 and 2015/2016 of BAMS degree programme were obtained from the authority and screened for absentees and withheld results. Candidates who were completed the examination were selected for the analysis. 91-course units were analyzed.

The final marks obtained by students for each course unit were recorded. Descriptive statistics, i.e. mean value, standard deviation and the range of the marks and frequency distributions and skewness are performed using SPSS 22 statistical package.

The quality and standards of the performance were discussed based on the results of the statistical analysis. Skewness, standard deviation and average marks of noted course units were compared. Based on the statistics obtained, observations were discussed.

Sample

Semester 1 of 3 consecutive academic years (2013/2014 1st batch following the new curriculum, 2014/2015 2nd batch following the new curriculum, 2015/2016 3rd batch following the new curriculum)

Sample included 91 subjects

Results and discussion

According to the analysis results shown in Table 1, the results of six subjects out of seven show a near symmetrical distribution. One subject shows a moderate right skewness. Two subjects out of seven have high mean values that are in the "A" grade range. The mean of the rest ranges between a "C" grade and a "B+" grade. Five subjects out of seven show standard deviations greater than 10, in 2013/2014 level 1.

In Level 2, five subjects out of 6 show nearly symmetrical distributions with one subject having a moderate left skewness. Five out of six subjects have standard deviations greater than 10. Mean values range between "C+" to "B-"range.

One subject out of seven in level 1 shows a high left skewness. Other subjects have nearly symmetrical distributions. Two subjects out of seven, including the one with the high skewness show high mean values that are in the range of "A-" and "A" ranges. Other subject mean values range between "C-" and "B+". Six subjects out of 7 show standard deviations above 10.

In level 2, two subjects out of seven show left-skewed distributions. Among them, one subject has a high left skewness. Two subjects have high mean values in the range of "A-" and "A". The subject with the highest skewness also has the highest mean value that is in the "A" range. All seven subjects have standard deviations above 10.

In level 3, three subjects out of seven have moderately left-skewed distributions. Four subjects out of seven that include the three subjects with skewed distributions have high mean values that are in the "A-" to "A" range. Also, six subjects out of seven have standard deviations higher than 10.

In level 4, two out of six subjects have skewed distributions. One of them has a very high right skewness that is greater than two. One subject shows a high mean value in the range of "A". Mean value of other subjects in the level ranges between "C+" to "B+". Only one subject has a standard deviation above 10.

In level 5, one subject out of seven has a moderate left-skewed distribution. Two subjects have high mean values that are in the "A-" to "A" range. Three subjects out of seven have standard deviations greater than 10.

In level, I, one subject out of seven has a moderate left skewness. The same subject has a high mean value which is in the "A-"level. Five subjects out of seven have standard deviations greater than 10.

In level II, one subject out of seven shows a high leftward skewness. Other subjects have nearly symmetrical distributions. Three subjects have high mean values which are in the "A-"

to “A” range. Six out of seven subjects have standard deviations greater than 10, with one subject reaching a standard deviation nearly reaching 16.

In level III, six out of seven subjects show nearly symmetrical distributions. Two subjects show high mean values in the “A-” range. Five subjects have standard deviations greater than 10. In level IV, one subject out of six shows high leftward skewness.

In level V, all subjects show nearly symmetrical distributions. One subject has a high mean value in the “A” range.

BPEN subjects have maintained a high mean value that is in the “B+” to “A” range through all 3 academic years. Even though BPEN course units are compulsory, they have no effect on the GPA because these course units are not considered for the calculation of GPA. However, it is worthwhile to monitor whether this high mean value is reflected in the general language skills of the students who complete the degree programme.

CHMA53172 has maintained a high mean value which is in the range of an “A” grade. This subject also does not contribute to the GPA.

DGPP31053 has held a mean value ranging within “B+” to “A-” range. This, being a core subject directly affects the GPA.

HBMB21093, which is a core subject, has also maintained a high mean value ranging between “B+” and “A-”, during the first three academic years it has been taught. In two years out of three, it has scored a mean value in the “A-” range. This being a core subject has a direct effect on the GPA.

HBHA11014 has been maintaining a minimum mean value which ranges between “C-” and “C+”.

HBHP21084, KBSR41013 and SSSL41014 also have relatively low mean values throughout the years in the range of “C” to “B-”.

Department of Basic principles has the highest number of subjects with highly/ moderately skewed distributions of the final results.

Discussion

In general, most of the course units have nearly symmetrical distributions. Occasional moderate and high skewnesses were noted.

Other than the few cases, most of the mean values lie within the “C+” to “B+” range.

The standard deviation seems to range between ±6 - ±15

High positive skewnesses seen at some occasions could be due to several factors which include, difficult course units, below par teaching skills, poor learning skills of the students, students are not being up to the expected standard, the poor relationship between the teacher

and student, personal influence on paper setting and paper marking, poor paper moderation, and overestimation of the students.

In the contrary, factors like easy course unit, good teaching skills, good learning skills of the students, students being above the expected standard, personal influence on the paper setting, and underestimation of the students can result in a high negative skewness which is occasionally seen in the processed results.

However, these extreme skewnesses are not prominent in the three academic years subjected to the analysis. Also, the high/ moderate skewness is not maintained over the years. They occur as relatively isolated cases.

Maintenance of high and low means of certain subjects over the years is also a noted point which could be due to several causes such as, maintaining the standard of the paper, too easy or too difficult course units and the possible personal influence, especially on subjects which the same teacher teaches.

However, it is noted that few departments have repeatedly produced results with high to moderately skewed distributions on the final results. This shows that there is some kind of influence on the factors which are mentioned above. Therefore, it is better if these departments can pay more attention to their evaluation process.

Reliability is commonly considered a needed but insufficient condition for validity. It is also considered an important supporter of fairness, safeguarding against the possibilities of subjectivity and bias. But, in the psychometric paradigm, defining reliability as a measure involving the calculation of differences between independent observations entails a significant degree of standardization (Pitman et al., 1999).

Conclusion

Based on the result analysis, it can be concluded that Gampaha Wickramarachchi Ayurveda Institute has been able to maintain the quality and standard of examinations the new syllabus in the first semester of the initial 3 years except for a few isolated cases of high skewnesses. However, it is recommended the deeper and more detailed result analysis which could probe into the marks gained for each component of a given course such as the viva voce, practical and written to give a more specific conclusion. Such an analysis would be the key to find any deliberate anomalies taking place during the evaluation process.

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List of Tables

Table 1: High Skewness recorded subjects and related departments

Year	Course code	Department	Skewness	No of cases
2014/2015	BPIT11031	Basic Principles	High	3
2014/2015	BPSA21101	Basic Principles	High	
2014/2015	GSRM41042	Graduate Studies Division	High	
2015/2016	DGMC23032	DravyagunaVignana	High	2
2015/2016	GSRM41042	Graduate Studies Division	High	

Table 2: Moderate skewness recorded subjects and related departments

Year	Course code	Department	Skewness	No of cases
2013/2014	HBHA11014	Basic Principles	Moderate	7
2013/2014	BPSA21094	Basic Principles	Moderate	
2013/2014	DGPP31053	DravyagunaVignana	Moderate	
2013/2014	CHMB31043	Chikitsa	Moderate	
2013/2014	BPEN31121	Basic Principles	Moderate	
2013/2014	GSRM41042	Graduate Studies Division	Moderate	
2013/2014	BPEN41141	Basic Principles	Moderate	
2014/2015	BPSA21094	Basic Principles	Moderate	6
2014/2015	DGPP31042	DravyagunaVignana	Moderate	
2014/2015	DGPP31053	DravyagunaVignana	Moderate	
2014/2015	DGPN33092	DravyagunaVignana	Moderate	
2014/2015	CHKA41104	Chikitsa	Moderate	
2014/2015	GSRM51062	Graduate Studies Division	Moderate	
2015/2016	HBBC11032	Basic Principles	Moderate	3

2015/2016	DGPP31042	DravyagunaVignana	Moderate	
2015/2016	BPEN31121	Basic Principles	Moderate	

Table 3: No of cases of high/ moderate skewness recorded in each department

Department	**No of subjects with highly/ moderately skewed distributions of results over the past 3 years**
Basic Principles	9
DravyagunaVignana	6
Graduate Studies Division	4
Chikitsa	2