EVALUATION OF THE FIRST YEAR PRACTICAL COMPONENT IN BOTANY IN THE B.SC DEGREE PROGRAMME OF OUSL: STUDENT AND STAFF PERCEPTIONS

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INTRODUCTION

Practical work can be recognized as one of students' major support components in the teaching-learning process, especially in science-based disciplines (Emson, 2013). The first year at university is very important for a student as it is the transitional stage from the school setup to an independent tertiary background. The Open Distance Learning (ODL) system is technically different from the conventional system. As a result, students may, relatively, have more adjustment difficulties to the ODL system in their first year.

Laboratory practical classes is a serious challenge for ODL institutions when they offer science-based courses due to their conflict with the "Distance concept" as well as in providing laboratory facilities, relevant equipment, and teaching staff for a large number of students. The advantages of providing distance students with practical work include reinforcing students' motivation towards subject matter, generating a positive attitude towards overall learning, and intensifying interpersonal relationships with tutors and peer groups. Comparatively, a large number of students register for the B.Sc. degree programme at the Open University of Sri Lanka (OUSL) and 50% of them are employed. Hence, it creates laboratory space difficulties, and conflict with education and work norms of students. The first registrants of the B.Sc. programme have to involve themselves in compulsory practical sessions for each subject except for Mathematics. The Department of Botany conducts practical sessions for two of the first year subjects of the degree programme, which are Plant Diversity (05 days) and Organization of Cells and Plant Biochemistry (2 ½ days). This study examines the difficulties and remedial measures that are perceived by students and relevant staff members for the first steps of these practical components.

OBJECTIVES OF THE STUDY

- To quantify the difficulties in practical classes perceived by staff/students.
- To identify the most problematic situations with regard to the practical component.
- To examine the suggestions made by students/staff to improve the practical component.

METHODOLOGY

This study was carried out to evaluate the perceived difficulties and suggestions made by students/staff for the compulsory practical (Botany) components of first year B.Sc. undergraduates, with a piloted questionnaire (Kuruppuarachchi and Gunerathne; 2014). The piloted questionnaire consisted of two major parts. Part I consisted of fifteen items; items 1 to 8 evaluated the students' demographic profile, items 9 to 12 requested students to rank the items provided under personal difficulties, difficulties regarding physical facilities, difficulties encountered in the teaching-learning process, and management difficulties, respectively, and items 13 to 15 mainly investigated a preferable period, time, and evaluation system for practical classes, respectively. Part II of the questionnaire was open-ended to examine the most problematic situations encountered in practical classes and requested suggestions to overcome difficulties.

The piloted questionnaire was randomly administered to students at the Colombo Regional Center (CRC) during the compulsory practical sessions of the Plant Diversity (BOU 1200) and Organization of Cells and Plant Biochemistry (BOU 1101) course units, which represented more than 10% (150) of the target population. The same open-ended questionnaire was distributed

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among the relevant staff members of Department of Botany, which included teachers (08), demonstrators (08), and technical offices (03), to obtain their perceptions. Responses to items 1 to 15 were tabulated using SPSS statistical software, while responses to open-ended questions were classified separately and analyzed using percentages of frequencies. These results were used for descriptive purposes with their calculated response frequency percentages (American Association for Public Opinion Research, 2000).

RESULTS

Characteristics of the sample: The study sample's students' ages spread across 18-23 years (44.7%), 24-29 years (40.91%), and over 30 years (10%). 75.76% of the sample group consisted of females, 85% were unmarried, and 54% were employed. 51.16% of students were from sub-urban, 26.36% from urban, and 22.48% from rural areas. 50% of the students travelled a distance between 30-120 km, 23.15% more than 120km, and the rest (23.85%) less than 30km.

Difficulties identified and suggestions made to overcome difficulties by the students and the staff included in the samples is summarized in Table 1 and Table 2, below, respectively.

Table 1. Students Perceptions: the most problematic issues in practical classes and suggestions to overcome these

Most problematic issues in practical classes	Response Frequency%	Suggestions made by students	Response Frequency%
Lack of sufficient equipment, chemicals, and laboratory space	56 (29%)	Limit student numbers in a practical group or increase the number of practical sessions	22 (21.35%)
Conflict with work norms (obtaining leave for practical continuously for 05 days)	31 (16.06%)	Increase laboratory facilities	17 (16.5%)
Intolerable, continuous, congested, And heavy workloads	30 (15.54)	Conduct practical classes on weekends in addition to weekdays (Friday and weekends)	17 (16.5%)
Difficulties in practical evaluation, i.e. insufficient time gap for preparing for practical assessment tests	29 (15.02)	Divide 05-day practical classes in to 2 sessions and distribute them over 2 semesters	09 (8.73%)
Less self-experimental facilities due to over crowding	15 (7.77%)	Expand practical classes to other regional centers	09 (8.73%)
Poor teacher-student relationships	11 (5.7%)	Improve self-experiment facilities in the laboratories	07 (6.79%)
Language difficulties	11 (5.7%)	Increase the number of demonstrators, if catering to large numbers of students	06 (5.82%)
Practical overlapping with other academic activities due to the non-flexibility of reserving practical classe	10 (5.2%)	Introduce a flexible and practical reservation system	05 (4.85%)
		Improve the quality and content /sufficient time gaps / Reduce the number of days of practical	11(10.76%)

Table 2. Staff Perceptions: the most problematic issues in practical classes and the suggestions made to overcome these (*Lab staff: Demonstrators, Technical officers; # Teaching staff).

Most problematic issues in practical classes	Response Frequency (total)	Suggestions made by staff	Response Frequency %(total)
*# Insufficient equipment, chemicals, and laboratory space	*15, #07(29.72%)	*# Arrange instruments/specimens/ chemicals in an up to standard manner (eg, clean, prepare, sufficient quantities)	*08, #04 (17.14%)
*# Large numbers of students per group	*07, #07 (18.93%)	*# Increase number of demonstrators, restrict no. of students , increase the number of groups	*07, #06 (18.57%)
*# Insufficient time to prepare for practical due to a continuously heavy workload	*08, #01 (12.17%)	* Recognize that cleaning of laboratory space is very essential	*05 (7.14%)

*# Students unprepared for practical classes have less theoretical knowledge	*07,#03 (13.52%)	* Divide 5-day practical classes over 2 sessions over 2 semesters	*05 (7.14%)
* Lab safety is not up to standard	*05 (6.76%)	*# Conduct practical workshops/day schools prior to practical classes for relevant staff/students	*09,#02 (15.7%)
* The number of demonstrators insufficient to conduct practical classes	*02 (2.7%)	*# Improve the reservation and record-maintenance procedure of practical classes	*04,#03 (10%)
# Less commitment, being not well prepared prior to practical classes, and a lack of punctuality of demonstrators and lab staff	#08 (10.8%)	* Effectively schedule timetables (without overlapping and with sufficient breaks between practical classes)	*04 (5.7%)
# Appropriate guidelines not received by students	#03(4.05%)	* Use a separate lab for microbiology	*02(2.8%)
# Discrepancies in conducting practical classes at regional centers	#01 (1.35%)	#Have well-trained laboratory staff or increase staff numbers	#04 (5.7%)
		# Active involvement of senior coordinator at every step	#04 (5.7%)
		#Decentralize practical work	#03(4.28%)

Personal difficulties (Item 9) faced by the students are summarized in Table 3 below:

Table 3. Personal difficulties faced by students

Type of the difficulty	Frequency (%)
Conflict between education and work norms	373(24.6%)
Transport difficulties	341(22.53%),
Accommodation problems	242(15.99%)
Language difficulties	207(13.68%)
Adjustment difficulties for group work	119(7.86%).

Students' perceptions on difficulties due to weaknesses in teaching methodologies (item 11) are summarized in Table 4 below. However, 44.56% (369 students) indicated satisfaction with the current method of how practical classes are handled.

Table 4. Difficulties faced by students due to weaknesses in teaching methodologies

Type of the difficulty	Frequency (%)
Insufficient guidance from senior coordinators	137(16.54%)
Poor contribution/ guidance from demonstrators	136(16.42%)
Not yet adjusted to ODL methodologies	123(14.85%)
Staff is unfriendly/ poor interrelationships	63(7.6%)

Difficulties faced by students due to weaknesses in management/administrative procedures (Item 12) are summarized in Table 5 below. A smaller percentage of students (13.46%) indicated they were satisfied with the existing practical management system.

Table 5. Difficulties faced by students due to weaknesses in management/administrative procedures

Type of the difficulty	Frequency (%)
Attending practical classes continuously for 5 or 2 ½ days throughout the week	289 (26.46%)
Congested and poor arrangement of the working schedule	274(25.09%),
An improper system to reserve practical classes	179(16.39%)
No prior guidance on the nature and structure of practical classes	116(10.62%)
Insufficient communication with the department	87(7.96%)

The results of frequency tabulation highlighted that in the allocation of marks for the practical component, 27.27% of students preferred it to be only from the submission of a report, 28.08% from the existing spot test system, 24.24% from laboratory practical tests (one hour), and 12.12% from written paper.

DISCUSSION

This study examined the perceptions of first year ODL B.Sc. undergraduates and staff, their responses to difficulties and issues in conducting practical classes, and the suggestions they made for the limited practical sessions of a Botany subject. The results (Tables 01 and Table 02)

revealed that insufficient materials in laboratories are the most problematic factor. The suggestions to overcome this problem were either to improve the physical condition of the laboratory or to allocate a manageable number of students per group. Suggestions made by students and staff to minimize the problem were to limit the number of students per practical group/increase the number of practical sessions (students: 21.35%, staff: 18.57%; see: Tables 1 and 2) and to arrange instruments/specimens/chemical supplies to the required standards (eg, clean, prepared, of sufficient quantity). It was also noted that without the provision of proper training and the increasing of the number of laboratory staff, it would be difficult to improve the conditions of the laboratory. Further, the decentralization of practical work to regional centers could minimize the difficulties faced by the CRC was a suggestion made by teaching staff (4.28%: Table 2). The lack of a practical reservation system for practical classes was recognized as one of the major failures in the conducting of laboratory classes, and introducing a better mechanism for this was considered to minimize this issue (by 10%: Table 2; by 5%: Table 1). Nearly half of the sample population of the study are employed and is required to apply for leave to attend the continuous days of practical classes. This was deemed to create stress and uncertainty among students, was indicated by 16% in open–ended question section of the questionnaire and ranked as a major personal difficulty by students (24.6%). More than 16.5% of students suggested conducting practical classes during weekends, which was demonstrated in the results of a similar survey for continuous assessment tests/CATs (Kuruppuarachchi and Gunerathne, 2014). This suggestion has been implemented by the Faculty of Natural Science since 2014 for CATs. Therefore, it is impossible to conduct practical classes on weekends due to overlapping with CATs. Students (8.73%: Table 01) and staff (7.14%: Table 02) suggested dividing the continuous 5-day practical classes into 2 sessions to be conducted over 2 semesters, which is a very positive suggestion to overcome the cited issue of "continuous, congested, and heavy workloads", as well as the problem students have indicated of obtaining leave.

The active involvement of the senior coordinator at every step of the procedure was indicated as being important (by 5.7%) as was the proper scheduling of timetables (without overlaps and with sufficient breaks between practical classes) by senior academics for each course unit.

The results of ranked and weighted items (item 9 and 11) indicated that 44.56% (369) of students have suggested alternatives that are most suitable for handling practical classes. Only a small percentage of 13.46% (147) indicated satisfaction with the existing practical management system (see Tables 3, 4, and 5). Therefore, the results of the study mainly demonstrated that the improvement of the management/administrative system of the laboratory component of the first year Botany subject could enhance the progress of the existing system.

RECOMMENDATIONS

Mainly, the physical and management structure of the laboratory should be improved to create a better laboratory environment. Further, the implementation of an efficient reservations system for practical classes, for the uniform distribution of students among each practical class group, is required. Additionally, the 5-day continuous practical component could be divided into 2 sessions to be conducted over 2 academic semesters of the year. Finally, it is concluded that if the needs of ODL adult learners are catered, by providing a successful facilitating process for teaching-learning, it will upgrade the quality of the degree and better retain students within the programme, which will reduce drop-out rates.

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