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KNOWLEDGE IMPROVEMENT AMONG PARTICIPANTS OF SCIENCE RESEARCH CAMP FOR SECONDARY SCHOOLS[1]

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ABSTRACT

FRIM has been the venue chosen by the Ministry of Education for the National Science Research Camp since the year 2000. This camp is tailored for form four science stream students with the aim to expose them on research activities and to develop their interest in scientific careers. During the camps the students learned about the research conducted in FRIM and conducted experiments supervised by FRIM's research officers. Forty-nine students were asked to fill questionnaires before and after the six-day programme of the camp. In the questionnaire used in the pre-post evaluation, respondents were asked to define technical forestry terms used in forestry research. A scoring system with a maximum total of 50.00 points for all the fields of forestry research was developed to measure the level of knowledge among the respondents. The result showed that a maximum score was 11 points before participation and 21 points after participation. The lower points on the pre-evaluation suggested that most students have little background on forestry technical terms, where majority (20.41%) of the respondents scored only 1 point. An increase on the score was found for the post evaluation, where the majority of the respondents scored 9 (12.24%). Obviously, it showed an improvement on the knowledge level among the respondents. Different patterns of increment in knowledge level were also discovered in both male and female students. Pre-evaluation showed that female respondents scored as low as 2.74 points with the males scoring 3.27 points. However, post-evaluation resulted in distinct increment in the female respondents' level of knowledge (10.42) as compared to the males' (7.00). It showed an improvement of 7.68 points in the females'. Generally for all students, the average score for before and after the programme was 3.06 points and 8.33 points respectively, with 63.24% improvement in the level of score-point gained. From the study, it can be inferred that the students acquired a greater than two-fold improvement on their level of knowledge in science, especially in the area of forestry research, after their participation in the programme.

Keyword: Pre and post, knowledge improvement, scientific research camp

INTRODUCTION

National Science Research Camp is an annual camp organized by Ministry of Education, Malaysia with collaboration of Forest Research Institute Malaysia (FRIM). FRIM has been chosen as the site for the camp since the beginning of the camp in the year 2000. The objective of the programme was to establish interest in the field of research among secondary students. At the same time the camp was also meant to expose students on forestry related issues.

Participants of this camp were form four science-stream students from all fourteen states in Malaysia. The six-day programme was held from 8 to 13 November 2002. The camp consisted of classroom and laboratory activities. Towards the end, the students were assigned with projects that were conducted in small groups. During the programme the students were expected to develop their knowledge in research especially in forestry sector. However, the improvement in the knowledge level needs to be quantified. This paper describes the initial level of knowledge and the increment patterns among the students due to the programme.

Research on knowledge improvement in forestry programme was conducted by Broussard and Jones (2001). In the study, measurements on knowledge improvement in participants were made using a scoring system. Cloughesy et al. (2001) had used the scoring system in measuring teachers' knowledge improvement on forestry programme. Participants' knowledge changes were measured by assigning scores to before and after programme participation. The study found that mean score had significantly increased,

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indicating increased level of knowledge and understanding towards forest systems, forest values and forest management among the participants.

In Malaysia, the pre-post and scoring technique was used by Ebil (1999) in determining the effect of environmental education programme towards environmental knowledge and attitude of 13 to 17 years old secondary school students. The study found that student that attended the environmental education programme showed a significant increase in their environmental knowledge. The environmental knowledge change was found to increase more than environmental attitude measured at the venue of the programme.

Assessments of environmental education programme using pre and post technique were also conducted by Moey (1999) and Napsiah (1999) at Pusat Pengajian Alam Semulajadi (PPAS), Department of Wildlife and National Parks (Jabatan PERHILITAN).

METHODOLOGY

The respondents were forty-nine secondary school students participating the National Science Camp. Identical questionnaires were given to the respondents before and after the programme. The respondents were asked to put their names so that the specific changes of individual scores can be measured. The respondents were asked to define a few technical forestry terms. These terms were taught as part of the syllabus during the programme. Definition of all the technical terms in the questionnaire were obtained from the researchers lecturing on the respective topics, which were forest ecology, forest hydrology, seed technology, wood technology, botany, wood anatomy and medicinal plants. Respondents were awarded maximum score of 10 points for each definition matched the correct answer. Total score for all questions was 50 points.

RESULTS

Total mean score

During the pre programme evaluation, the highest percentage of respondents (20.41%) scored 1 point (Table 1). Pre programme highest score was 11 points. An increase of the score after the programme was obtained where the highest percentage (12.24%) of the respondents scored 9 points (Table 1). The highest point scored after the programme was 21 points. Overall, the mean score for all respondents was 3.06 points before and 8.33 points after the programme. Although the scores were still considered low, an increment of more than two fold in knowledge (63.24%) was found. The difference of scores between pre and post programme was also found significant by a T-test.

Differences between genders

There is a different pattern in the increment of male and female respondents. Female respondents scored a mean of 2.74 points before the programme. The mean was increased (73.7%) up to 10.42 points after the programme (Table 2). Meanwhile, male respondents scored 3.27 points before and 7.00 points after the programme, indicating 53.3% of increase level (Table 2). The increased level in both male and female scores after attending the programme were also found significant by a T-test.

Differences between terms

Comparisons were also made on respondents' understanding towards each term. The mean score for each term were shown in table 2. The highest score for both pre and post programme was for *Tongkat Ali* (2.00 points pre and 2.41 points, post). However, a T-test on mean score for *Tongkat Ali* was found to be not significant. However, T-test conducted on other terms indicated significant differences between pre and post programme, although the means were not as high as for *Tongkat Ali*.

Table 1: Frequency of points scored by respondents (%) before and after programme

Score	Percentage of respondents (N=49)	
	% (Pre Programme)	% (Post Programme)
No points	12.24%	12.24%
Score 1 point	20.41%	0.00%
Score 2 points	16.33%	2.04%
Score 3 points	10.20%	2.04%
Score 4 points	18.37%	6.12%
Score 5 points	6.12%	6.12%
Score 6 points	6.12%	6.12%
Score 7 points	6.12%	4.08%
Score 8 points	2.04%	8.16%
Score 9 points	0.00%	12.24%
Score 10 points	0.00%	10.20%
Score 11 points	2.04%	4.08%
Score 12 points	0.00%	6.12%
Score 13 points	0.00%	8.16%
Score 14 points	0.00%	2.04%
Score 15 points	0.00%	2.04%
Score 16 points	0.00%	6.12%
Score 21 points	0.00%	2.04%
Total	100.00%	100.00%

Table 2: Pre and post programme mean scores for male, female and overall respondents

	Pre Mean Score (N=30)	Post Mean Score (N=19)	Percentage increment
Male	3.27	7.00	53.3%
Female	2.74	10.42	73.7%
Overall Mean Score (N=49)	3.06	8.33	63.2%

Table 3: Mean score of all respondents for all terms used in the programme

Terms	Pre Mean Score (N=49)	Post Mean Score (N=49)	Percentage increment
Kitaran Hidrologi (Hydrological cycle)	0.27	1.37	80.1 %
Dormansi (Dormancy)	0.00	1.63	100%
Pulpa (Pulp)	0.53	1.20	55.8%

Table 4: Mean score of all respondents for all terms used in the programme (continue)

Terms	Pre Mean Score (N=49)	Post Mean Score (N=49)	Percentage increment
Papan lapis (Plywood)	0.27	1.71	84.2
Tongkat Ali (A medicinal value tree species)	2.00	2.41	17.01%

DISCUSSION

Very little change in scores were revealed among the participants of the National Science Camp. This was evidenced by mean scores for the all respondents between pre-test and post-test that ranged between 3.06 and 8.33. The low score before the programme was due to majority of the respondents (20.41%) scoring only 1 point. This indicate that most of secondary school students has little background on forestry sector. There was a slight increase on respondents' level of knowledge after the programme. Even though the scores were still considered low after participation, the national science camp has succeeded in improving the students' knowledge. Through the activities, the level of knowledge has increased to more than two-fold (63.24%). Different patterns in increment between male and female respondents were found. Female respondents were found to have higher increment in knowledge level. The same result also found by Ebil (1999) in his study on secondary students of environmental education programmes' participation. From the result on terms used in the programme, it was found that the percentage of increment on all terms were found to be more than 50%, except for *Tongkat Ali*. Increased knowledge levels on the forestry terms suggested that the students have learned and gained new information on forestry terms and issues during the programme. The mean score on *Tongkat Ali* terms was found higher than for other terms. This is because the term *Tongkat Ali* is quite common as a well known medicinal herb that it is almost a household name.

CONCLUSION

The study found that students have learned and experienced some basic research techniques in forestry. There were also new knowledge found in technical forestry terms. Usually, the forestry research camp programme takes a longer time period and with more practical activities to understand the terms and the field better.. Such technical research techniques were normally conducted in the tertiary level of learning such as for a bachelor degree or a post graduate level. One of the shortcoming of the this study is the subjective and rigid scoring scheme developed to evaluate the definitions of the technical terms, which led to low scoring points even for the post. To improve this, the construction of the closed-ended questions instead of open-ended. By doing this, it may eliminate the subjective scoring scheme.

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