

MOTIVATING ENGINEERING LECTURERS TO CONDUCT ACTION RESEARCH

T. Subahan Mohd Meerah
subhan@ukm.my

Azami Zaharim

Universiti Kebangsaan Malaysia,
43000 Bangi, Selangor, Malaysia.

ABSTRACT

This paper would like to share Universiti Kebangsaan Malaysia's experiences in propagating engineering lecturers to conduct their own action research in order to improve their learning and teaching. This is in response to the shift on the roles of lecturers teaching from merely transmission of knowledge to facilitating of student's learning. And it has become also the responsibility of lecturers to prepare students for their career or to gain employment after graduation. It emphasizes that universities lecturers need to reflect on their practices in order to improve on the quality of their teaching or students' learning through action research.

INTRODUCTION

The university has provided first a platform and then a small grant by setting up a Centre of Engineering Education to motivate lecturers to conduct action research including encouraging them to present their findings in a workshop. Many papers were presented and published in the workshops proceedings.

Document analysis of the papers presented both in term of quality and quantity in the workshops held so far indicated the lecturers have undergone a long way in inculcating the action research culture. A model of inculcating the action research culture in the university can thus be proposed for other institutions to embark on teaching and learning research.

Not many lecturers realize that they are to play a significant role in the students' learning, both in terms of facilitating or supporting the quality of students' learning, and thus to equipping them with the appropriate skills and knowledge for their future careers in the industries when they leave the university. On the contrary, the graduates are at the mercy of their employers when they seek for employment. Employers are demanding university produce graduates that are equipped with the needs of the industry. The industries are using very severe criteria in their selection of their employees. They no longer based the criteria for selection solely on the graduate's academic achievement but are looking for other critical factors like the ability and skills in problem solving, critical thinking, language competency and leaderships. Future graduates need also to acquire entrepreneurial and innovation skills in order for the industries to compete globally. Of course university lecturers are researchers in their own field of expertise

but they also need to embark on action research to improve students' learning and their practice. As summarized by Mazlan et. al. (2007) "... Malaysia's provisional entry into the Washington Accord has resulted in an overhaul in engineering education in this country. Gone are the days of traditional teaching in engineering. A myriad of changes have followed including changes in attitudes, orientation, curriculum, and delivery, to name a few. A learner-centered classroom we are moving to, from the traditional teacher-centered classroom. This clearly indicates that learners are very well in control of their own learning – they are self-directed – and teachers are master learners, learning along side students. Individualized learning plans are visible, but usually within a single comprehensive program aligned with a standardized assessment..."

The Faculty of Engineering in UKM originally faced first, the daunting task to convince lecturers on this need. There are of course resistance and concerns on letting loose their role as researchers in their own field of concentrations and to venture into engineering education research, which they are ill equipped. This is because most engineering education researchers were traditionally trained in their field of expertise. It is frustrating to engineers who are more accustomed to working within long-standing paradigms. Second, as Boreggo's (2007) study has shown lecturers from engineering faculty experience the conceptual difficulties as they become engineering education researchers. Thus, the engineering lecturers need to acquire the knowledge and skills in conducting educational action research methods. There are of course differences between engineering research and engineering education action research. This could be a potential source of difficulties and frustration for engineers in embarking on educational action research. Engineering lecturers should work with a colleague in the education field collaboratively to help overcome the difficulties. Thus, UKM has organized regular workshop on action research as part of professional development courses for lecturers from various disciplines as well as special workshop as requested by the faculty. Lately, Higher Education Leadership Academy (AKEPT) of Ministry of Higher Education has organized 3-days workshop on Action Research. The last one was held in November last year. The next one will be held on November this year.

Besides organizing the workshop, engineering lectures are encouraged to collaborate with the counterparts in the faculty of education who are familiar with engineering education and methodology of action research. In order to expedite the above purposes, the faculty has established unit which was name later as *Centre of Engineering Education Research*. To inculcate the action research culture, further workshops are organized yearly for the researcher to present and share their own learning and teaching research findings. Their papers were published in the proceeding books.

Surprisingly a significant number of papers were presented and the participations were very active. However, the quality of papers needs further improvements both in term of the writing of the reports and the research methodology. A number of insights were obtained from an analysis of the papers. And a face to face interview was held with some lecturers in a study to find out their reactions on the action research. The feedback obtained showed that higher order research skills on action research are needed to be provided for the lecturers to enhance their research skills. Further, lecturers are encouraged to disseminate the action research findings.

A strong case for engineering education action research was made through providing grant for action research. Secondly, the university promise to recognize that action research can be considered as a part of the merit criteria for promotion exercise. It was observed, a greater enthusiasm of lecturers was shown in embarking action research since then. To summarize, what we can learn from the above experiences are provided as follows:-

1. Engineering lecturers need to be equipped with skills and knowledge in action research
2. The faculty should provide conducive environment in promoting action research
3. The lecturers attitude need to be changed and convince on the importance of their roles as facilitator of learning
4. Both intrinsic and extrinsic motivation need to be considered
5. Enriching workshops be held to foster action research culture
6. University can be more motivating by providing grants and provide recognition on lecturers work
7. Further motivation can be made by awarding best paper and publication
8. Publications in refereed journal and privilege to attend seminars for lecturers to present their papers
9. Continued reinforcement by the faculty in propagating action research culture through workshops and seminars

FINDING OF THE STUDY ON ACTION RESEARCH CULTURE IN ENGINEERING FACULTY

Below are some of the findings on the study of action research that have been carried out so far based on the papers have been presented in the workshop

METHODOLOGY OF ACTION RESEARCH IN ENGINEERING EDUCATION

Majority of the researchers employed quantitative approach in their study. Some authors feel action research as qualitative in nature. However some endorsed the use of both qualitative and quantitative design. It is understandable that as majority of engineering action researchers are engineering lecturers who were trained within the post positivist perspective, and the audience for much of engineering action research is also from engineering faculty, who have more experience interpreting quantitative data, thus the approach used in quantitative.

However, in education, the view is that the approach used by a given research should be driven by the problems of the research. And because there are a wide variety of issues to be studied within the teaching and learning engineering setting, it is expected that both qualitative and quantitative methods including mixed research methods should be used in embarking action research. Thus it necessitates that those who are not familiar in qualitative approaches be trained through professional development courses or made them collaborates with those who are familiar with these research methods in educational setting.

ACTION RESEARCH AREA

Analysis of the research was made and categorized under the heading of curriculum, evaluation, teaching, learning and career based on the objectives of research. The following tables summarize the result of the analysis. As can be seen from the tables, most of the research falls under the category of evaluation and more research be done on other areas like curriculum and career development. Further analysis was done on reading the content showed that more in depth studies need to be carried out to understand students' learning.

Table 1: Proceeding PEKA 2008

NO.	CURRICULUM		EVALUATION		TEACHING		LEARNING		CAREER	
	AR	OR	AR	OR	AR	OR	AR	OR	AR	OR
1										X
2				X						
3				X						
4					X					
5							X			
6					X					
7								X		
8							X			
9								X		
10							X			
11					X					
12						X				
13						X				
14				X						
15			X							
16				X						
17			X							
18						X				
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22			X							
23				X						
24			X							
25				X						
26			X							
27			X							
28				X						
29				X						
30			X							
31	X									
32				X						

33				X						
34			X							
35					X					
36				X						
37					X					
38		X								
39					X					
40		X								
41	X									
42								X		
43										X
44								X		
45										X
46										X
47									X	
48		X								
49		X								
50			X							

Table 2: Proceeding PEKA 2009

NO.	CURRICILUM		EVALUATION		TEACHING		LEARNING		CAREER	
	AR	OR	AR	OR	AR	OR	AR	OR	AR	OR
1						X		X		
2						X				
3				X						
4				X						
5								X		
6						X				
7					X					
8										X
9								X		
10							X			
11								X		
12							X			
13		X								
14		X								
15		X								
16						X				
17								X		
18			X							
19										X
20			X							
21								X		

22			X							
23					X		X			
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25		X								
26		X								
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28					X					
29			X							
30			X							
31		X								
32	X									
33								X		
34		X								
35							X			
36					X					
37							X			
38								X		
39					X					

AR = Action Research
OR = Other Research

DISCUSSION AND CONCLUSION

The paper has provided an overview of the experience of an engineering faculty from one university on the development of action research culture among the lecturers. The university has gone a long way to inculcate action research. The faculty of engineering as seen many its lecturer embarks action research to improve teaching and learning of students.

The paper has highlighted the need for lecturers to be aware of their role as facilitators of learning and the need to continuous improve students' learning. They need to be motivated to embark on action research in order to improve their practice. To realize the above aim, lecturers need to be equipped on the knowledge and skills on doing action research. They may need to work with other lecturers in education or social science collaboratively in doing action research. We are encouraging other universities to follow the example of UKM so that we can improve the quality of our product. Universities have also to do their part by recognizing the works and publications of the lecturers in the area of engineering action research which is a new field. The model below proposes a way to inculcate action research in universities:

Lecturers
Awareness of
their
Roles

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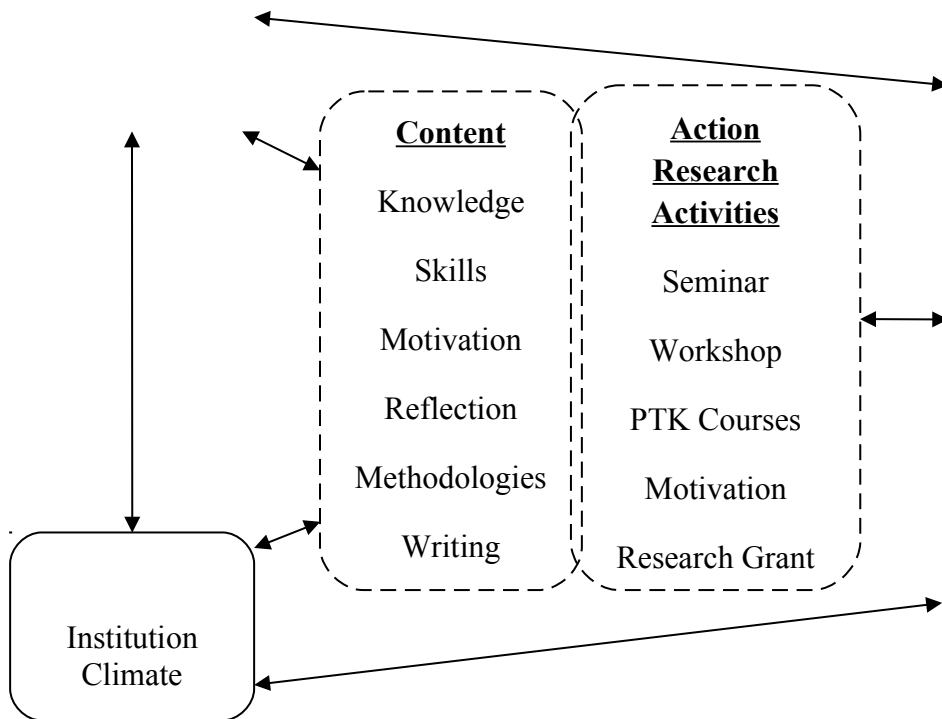


Figure 1: Model for inculcating action research.

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