

Effective Supervision Strategies in Improving the Quality and Quantity of Research

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Abstract: The criteria for evaluation a Research University (RU) that contribute the highest possible ranking are the quality and quantity of research. Quantity and quality refers to the strength of research in terms of the energetic nature of that research, financial assistance in the form of grants and research output. These aspects are achieved through proper and effective supervision. Effective supervision ensures that research runs smoothly and that it can also have an impact on research excellence. Effective supervision with the proper from the research team leader will be met with spirit by the student body and will lead to robust productivity. This study describes two elements of motivation, supervision and guidance and describes effective monitoring to improve both the quality and quantity of the research. Quality and quantity of research is a particular focused of the current issue of this journal and is an important topic in higher education in Malaysia.

Key words: Supervision, research university, monitoring, mentor, mentee, Malaysia

INTRODUCTION

By 2020, the National Higher Education Strategic Plan (PSPTN) has mandated that at least three institutions of higher learning in Malaysia be listed among the 100 best universities and that at least one is among the top 50 universities. Accordingly, on 11 October, 2006, the Malaysian government announced this requirement through the Ministry of Higher Education (MOHE) recognizing four institutions of higher learning and recognizing the 1st Research University (RU). With the financial injection of an average of MYR80 million a year, the strategic plan is that a university is able to boost its performance and become a hub of excellence, particularly in the areas of research and education. There are eight criteria for the recognition of an RU that are to be monitored by the evaluator of the RU and these criteria have been developed with a focus on aspects of Research, Development and Commercialization (R, D and C). Some of these criteria are also adopted from several internationally acclaimed rating agencies as shown in

Table 1. Two of these criteria are the quantity and the quality of research. The quantity of research refers to the number of lecturer-researchers, the number of grants from inside and outside the country and the number of published in a journal articles indexed in scopus and Institute for Scientific Information (ISI) only. Quality refers to the importance of a research citation or reference. Citation can indicate the impact of a publication or research project. If the citation in a manuscript is from a quality institution of higher education, those citations will have greater influence than those from lesser institutions

Table 1: Criteria for the recognition of research university in Malaysia

Criteria	Weight (%)
The quantity and quality of researchers	25
The quantity and quality of research	30
Quantity of post-graduate	10
Quality of post-graduate	5
Innovation	10
Professional services and gifts	7
Network and link	8
Supportive facility	5
Total	100

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of higher education. There are two parameters used to determine research quality: impact factor and H-factor index. Impact factor was introduced by Eugene Garfield in 1955 and is a measure of the citation frequency of articles in journals that have been cited during a particular period or year. Impact factor is calculated with reference to the ratio of the number of articles published.

Index-H is value added to the Impact factor that refers to frequency of articles that are cited on a cumulative basis. Index-H was introduced by the physical scientist Jorge E-Hirsh in 2005. To achieve good performance in quality and quantity of research, student supervision systems play an important role. Effective supervisory systems and intelligent reward of excellence in every measure of assessment will ease the task of a lecturer researcher. Lecturer researchers refer to the lecturers who do research in any faculty at a university. This study will discuss strategies for effective supervision that will produce quality students and that will result in publications of increased numbers of journal articles and meeting proceedings. Two elements of supervision and motivation guidance using monitoring systems that are excellent strategies for achieving a greater numbers of publications will be explained.

Ongoing motivation: Apart from a complete infrastructure for students, ongoing motivation should also be provided by each supervisor. Effective supervision requires a good professional relationship between student and supervisor and requires significant academic experience (Evans, 1997). Lee (2009) defines supervision as an association by hierarchy with discipline and oversight of research students should be motivated to increase make their desire to produce significant results. Each supervisor must be equipped with the skills to provide motivation for their students. The supervisor is a mentor who interacts with his or her students to help them achieve their goals. Students who are mentored effectively will be motivated excellence and the momentum of this motivation will remain with the student for the rest of his or her life. Mentoring is designed to support and to encourage people to manage their own education so that they may maximize their potential, develop their skills, improve their performance and become the person they want to be (Parsloe, 1999). While a students' motivation may ebb and flow, a supervisor should try to help consistently improve that students' motivation. Vesilind (1999) described that a mentor as something like a tattoo that stays with you forever.

The roles of lecturers can have a big impact on research and on student success and is dependent on available resources. Graduates mentored by a particular

supervisor or system will tend to use the same methods, they learned during their period of supervision. In other words, the supervisor is a master teacher and iconic to his or her students. Good supervision will produce quality graduates. Normally, a good mentor is derived from good and responsible parents. Thus, the harmony of the household of a supervisor or the nature of the mentoring and education that they have received will determine the quality of supervision. In other words, the success of a particular lecturer directly related to the happiness of his or her domestic life. The characteristics of a good mentor that are listed here:

- Listens patiently and focuses on making observations (the eagle-eyed)
- Reliable
- Give advice
- Encourages and offers support
- Gives constructive criticism
- Open and honest
- Models through actions and words
- Willing to take time to reach out and to share
- Serves as an effective intermediary

Each student can therefore be seen as a pencil. To be sure, we are writing or marking OMR smoothly in an examination for example, your pencil must be sharpened before entering the examination hall. Similarly in a supervisory situation, students need to be prepared with knowledge and skills before they can begin to contribute to an investigation. Keep in mind that a pencil that is not sharp may damage and sub-sequently, cancel the OMR forms.

Comfortable facilities: When students 1st begin to matriculate through graduate studies, there are two places that they typically spend their free time; their hostel or rented house and their research laboratory. To produce students who are pro-active and who contribute, it is the duty of each supervisor to develop initiatives in order to increase the time students spend in the laboratory rather than at home. If happens, it is due to the lecturers conducting their research and essentially living in the laboratory from morning to night where research is conducted 24 h a day. Supervision and monitoring will occur in a smoothly and orderly fashion. If this culture exists, researchers will have no problem being involved in many research presentations because their students are always willing to work hard day and night to complete all requirements such as prototyping, posters, pamphlets and other responsibilities. Conversely, the supervisor should be very concerned when students are elsewhere (with the

exception of the library), they will certainly lose focus and became less productive. The problem is that this depends on the supervisor. How did he shape his laboratory research? What else can he do to motivate his students to spend more time in the laboratory? Some factors that could make the lab a place students where want to spend more time in include the following:

- 24 h internet access
- Adequate reference facilities (mini-library)
- Private workspace
- Facilities for food storage (refrigerator and pantry)
- Sources of entertainment (such as radio and television)
- Meeting tables

For example, the research laboratory has been equipped with all of the above materials and I have managed to keep the students in the laboratory. Furthermore, the focus of the research is on developing broadband network connections for premises to provide audio and video equipment that incidentally can also be used by students for their own entertainment. Every Friday morning, the students spend time together watching a movie that they have downloaded from the Internet.

If students want to have a discussion, meeting tables are available. These facility and other facilities not listed previously have led the students to prefer spending their time conducting research. It is also a challenge for a supervisor to encourage students to spend more time in the laboratory. Supervisors are like a king or the head of a government that has the right to establish rules patterns and to provide facilities for its people (the students). However, all student activities must be monitored constantly to prevent them from deviating from their primary focus. Students must be guided, motivated and well praised. Achievements of lecturers or research groups should be recognized and highly praised. Lunch or dinner together or watching a movie together is a bonus prize that may be awarded for their contributions. A supervisor's generosity towards his or her students will be beneficial to them in the end. Such activities will make an impression on a student and will encourage faithfulness, loyalty and honesty in them (Fig. 1).

Using resources effectively and wisely: As university researcher, we have access to a variety of resources publications such as graduate students, post-doctoral fellow, references libraries, physical facilities, grants and other research resources that can be used to produce publications. What makes a person less productive is that researcher fails to use these resources effectively. For example, editing services should be used with either one

because they are professional editors who are proficient in writing and who are often peer reviewers for professional journals and such input may be viewed favourably by a potential reviewer. Researchers from Korea and Japan are using this service to help increase the number of their publications. Like an honorarium, a grant should be used wisely because the money can be used to increase the quality of an investigation. Students who are proactive and highly committed can be awarded by giving them honorarium.

Involving students in organised activities: To ensure that you have captured the interest of a student, always involve him or her in additional activities. For example, encourage students to participation in workshops to come to your lectures and occasionally invite your student to give a formal presentation. With the motivation by these activities, your students can learn from you as master and they will be grateful.

A lecturer is a supervisor, friend, counsellor and boss supervisor: The supervisor directs research, provides all research facilities and monitors the progress of student research.

Friends: Sometimes, the supervisor must act like a friend. Students and supervisors must share their hate and love of things. When in general agreement, supervisors and students will be happy working together and will produce quality research. For example, supervisors and students should be harmonious their relationship. From the above example, the spirit of friendship and cooperation can help solve a problem.

Counsellor: As in a family, the supervisor is someone with whom a student can share complaints or problems. A frequent complaint by students is that they cannot afford their fees because they are too expensive. Sometimes, a supervisor has to go to a police station to bail out of jail an overseas student who was arrested as a suspected thief.

Foreign students often regard a supervisor as a parent and someone who will solve their problems for them. Although, it may be painful, a supervisor must resolve the student's problem wisely. If we always help the students or colleagues, we will be highly honoured and the suffering of bitter trials will also be shared by the students. Students frequently ask the question: Dr, how many journal articles must you to have published so that you may be promoted to Associate Professor? That is a question I have been asked previously my students. If this happens, it shows that you are in your student's heart.



Fig. 1: Research laboratories should be developed as a centre to research, socialize, learn, discuss and other entertainment. It may encourage students to spend a more time in the laboratory than at home; a) Spectrum Tecnology Research Laboratory (Spectech); b) Electronic workshop; c) Test stage 1: Optical Communication System and d) Test stage 2: Small World Communication System

Boss: Not all students are mature, proactive and focused on their work. Sometimes lectures will serve as a boss who monitors the students and reminds them of their responsibilities. This is important for ensuring that students are always committed to their research. Next, they can spend time learning to excel. Reminders in the form of letters, emails and text messages should be used to help them to be careful to continue to improve their grades. A supervisor should be strict to ensure that students do not violate the rules. If errors are made, action must be taken and you may have to threaten them. Use of threats is less than ideal but at times a threat may improve future performance.

Completion of studies must be accomplished in the shortest amount of time to avoid spending excess time and money and so that the supervisor may recommend them for work in high profile companies. Ultimately, who benefits? The answer is the students. Figure 2 showed survey that has been conducted on post-graduate students from both social science and science and technology division. Lots of characteristics have been selected to identify supervisor's ideal criteria. The

majority of the post-graduates agree that their supervisors are negotiable and motivated. Quite a few students clarify that their supervisors are not patient, not objective-driven and not motivated person. Even some students think the opposite side, numerous students are agree their supervisors meet all the criteria. It is indicated that only small numbers of supervisor are not meet the criteria from the student's eye.

Even their supervisors are busy and strict, students can manage it wisely. Moreover, they agree that their supervisors are always available when they would like to meet and also their supervisors are an open and leisure person. Although, lots of characteristics of supervisor student encounter, hopefully student may manage and control their research to meet the objective and completed successfully without problem. Figure 3a, b showed differences the proportion of percentage on post-graduate students of Social Science and Science and Technology Division in UKM Malaysia. Clearly, students from social science positively agree that their supervisors are more reach the characteristics with at least 90% yes. Most of the reason is the Social Science students did more on

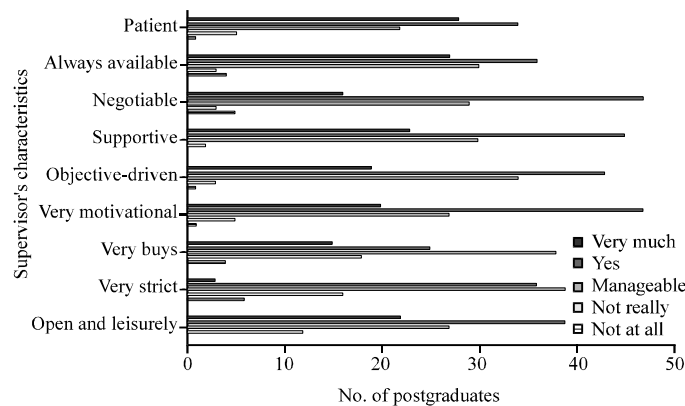


Fig. 2: The characteristics of supervisor that driven student to meet their primary target. A survey has been conducted on post-graduate students in UKM Malaysia

Table 2: No. of publications produced by a research group in a reputable university in Malaysia from 2006-2010

Years	International proceeding	Best paper award	Non-indexed journal	ISI/Scopus US indexed journal	Impected journal	Chapter in book	Exhition award	Book
2006	6	0	0	1	0	0	0	0
2007	11	0	0	2	0	0	0	0
2008	36	2	15	3	0	0	2	0
2009	80	1	12	32	4	1	6	0
2010	20	0	4	7	12	3	4	1

qualitative method. While for science and technology, students did both qualitative and quantitative methods on their research. Moreover, they preferably agree their supervisors are supportive throughout when doing the research. Nevertheless that their supervisors are strict and busy where 64 and 62% students agree. But it was different for social science student whereby their supervisors strongly busy and strict. It may be the reason they want it to be perfectly to meet the objective of their research. Even though, they are strict and busy but all Social Science students have the same opinion their supervisors are motivated and an objective-driven person.

Guidance towards quality publications

Case study 1: Spectrum Research Laboratory was developed in the middle of 2008. The hardworking supervisor made this facility into an excellent laboratory from 2009 to the present. This is a good start and the template used by that supervisor required all students write and publish manuscripts, regardless of the quality of the journals in which they were published. His goal was to train the students to be excited when an investigation has been published.

In the following year after initial training and with better research results, they focused on increasing the number of publications in journals indexed in scopus and on reducing the number of publications in journals that were not indexed. In following year, they were successful in producing publications in high impact journals and the

students were also able to publish their research and publish in high quality journals. The achievements accomplished by this group are shown in Table 2 and Fig. 4 by category.

Effective monitoring strategies: Effective monitoring is the best way to ensure that an investigation is always moving forward. Various methods such as the provision of log books, research report forms in either soft or hard copy and student presentations are commonly used monitoring techniques. Making use of basic research reports for publication does not exempt student from monitoring so that he or she will produce a publication. Reports submitted by students may contribute to the production of a journal article or proceedings if those reports reach an acceptable level of quality. This study will describe the process of improving progress reports that can become journal articles.

Format and style of writing: Not all the journals have special formatting requirement for the evaluation process. Formatting will be done after a manuscript is accepted for publication. However, all submitted manuscripts must have the following elements: a statement of the research problem; the objectives of the study; reference to the cited literature; any reference materials used; a statement of methodology; the study design, description of any instrumentation used; performance data presented in scientific format; critical analyses and conclusion. In the

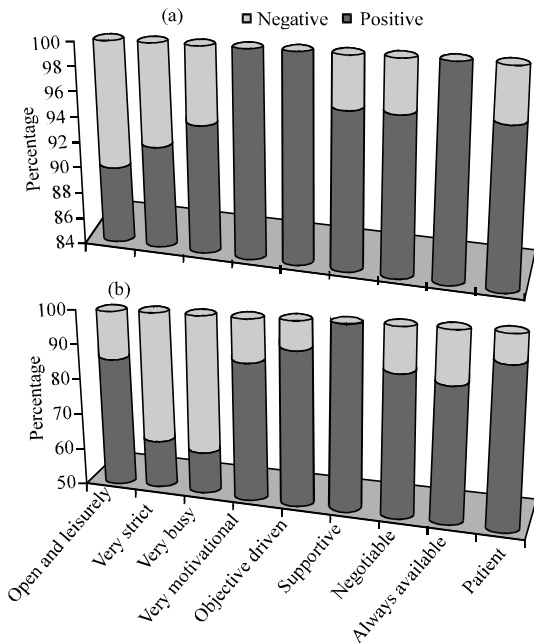


Fig. 3: Proportion on survey for post-graduate students of; a) Social Science and b) Science and Technology Division on their supervisor characteristics

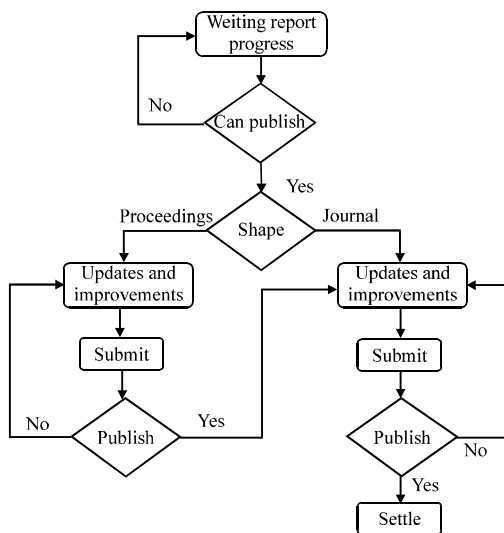


Fig. 4: A flowchart for how to publish a meeting proceedings or a journal article

report format, student must follow a defined flow of progress. Each progress report should be prepared and should include all format elements from the beginning to the end. Manuscripts or journal articles that have been submitted should have the potential to be published as a journal article or conference studies. Any manuscript that

has been published as conference proceeding may then be upgraded to a journal article after the evaluation process. For example, the responses from and comments made by audience members during a presentation can be incorporated into a journal article or manuscript to improve it.

Classification determines publications: The role of the supervisor is to determine wisely the classification of student manuscripts. Language proficiency is important in ensuring successful publication of journal articles. The type of journal to which a manuscript is submitted by both the results and quality of manuscript. In the other words, the results of an investigation may determine in what type of journal, the manuscript should be published. In the investigation of true concepts, sideline studies are more suitable to submit journals to high impact journals. Moreover when the research results indicate that there are more to be more future investigations, make reference to recent findings and to new theories, those results will have an increased chances of being published in high impact journals such as those published like a Elsevier, Science Direct, IEEE and others.

Improvements: Any comments or suggested improvements of a scientific investigation resulting from an attendee's participation in a seminar within or outside the country can be important in improving the impact factor of a meeting proceedings or journal articles. Therefore, these comments should be noted and discussed by the supervisors and students to maximise their utility. To make these activities more effective while a student presents his or her research in a seminar, another student should record the questions asked by the audience throughout the seminar.

Publications: After a manuscript is improved, it can be sent for evaluation by experts within specific areas of expertise. If a manuscript is rejected begin again; write to the journal describing improvements that resulted from the comments of experts in the field (Fig. 5).

Monitoring structures: Monitoring structures also play an important role in the success of a research group. The researchers instruct students by level (pre- and post-graduate and graduate students conducting doctoral thesis) and by the details of their research topics. One of the best structures is the Mentee Mentor System in which undergraduate students are monitored by post-graduate students and post-graduate students are monitored by a PhD (Doctor of Philosophy) candidate.

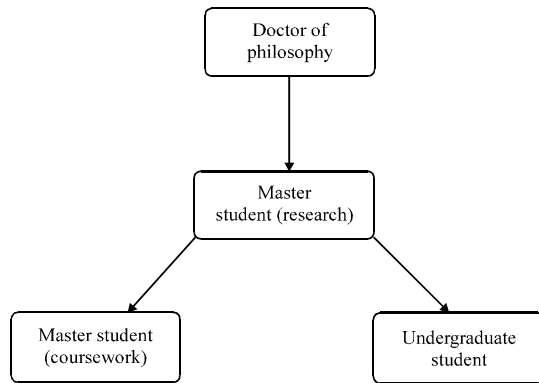


Fig. 5: A proposed supervisory structure for an organization

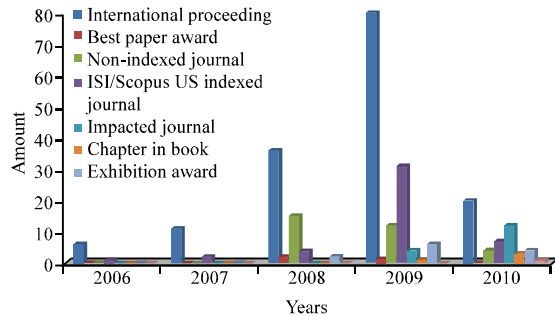


Fig. 6: No. of publications produced from 2006-2010 by a research group in a local public university in Malaysia

Mentoring is a collaborative partnership between a mentor and mentee working towards improving important skills, knowledge and experience (Mariam, 2011). Undergraduate student projects should contribute to master's project and master's project should contribute to a doctoral thesis project. The implementation of a good monitoring system will save the supervisor time and allow him or her to engage in other activities. For example, a proposed monitoring structure is shown in Fig. 6. A doctoral candidate is able to monitor two post-graduate

students to support his or her research. Each post-graduate student may be assisted by an undergraduate student and a graduate student in course work. This regular structure is systematic and can foster research excellence.

CONCLUSION

A successful post-graduate depends not only on the number of his or her publications but also on the supervisory strategy practiced by a supervising lecturer-researcher. Passionate motivation and strategic monitoring can be a key factor in producing a quality post-graduate. By following an excellent supervisory strategy, respected university will easily be listed as one of the 100 best universities in accordance with the aims of PSPTN Malaysia.

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