

## **Use of Technology, Job Characteristics and Work Outcomes: A Case of Unitar Instructors**

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*Fifty-two UNITAR instructors were involved in the survey by responding to questionnaires that were personally administered by the researchers. The university implements learning method that blends both e-learning and conventional methods. However, the use of technology among the academic staff varies. The purpose of the study is to measure the relationship between job characteristics and work outcomes; internal motivation, job satisfaction and perceived work effectiveness and to measure to what extent the different level of technology use influences all these variables. The questionnaire was developed based on the Job Diagnostic Survey (JDS) instruments. Discussion and recommendation were made based on the survey findings.*

**Keywords: technology, instructors, job characteristics, motivation, satisfaction, work effectiveness**

### **1. Introduction**

In Malaysia, Web-based learning became an instructional delivery method especially in universities that provide external programs (Poon et al, 2004). Local universities such as University Tun Abdul Razak and Multimedia University Malaysia are incorporating virtual learning method in their programs. A study conducted in Sultan Qaboos University (Abdelraheem & Al Musawi, 2003) that involves 670 faculty members indicates that the Internet is used as instructional purposes especially in courses and in downloading materials. Given the advancement in technology, educators are eager to apply technology in their daily work but feel frustrated as they fail to achieve effective learning and receive complaints from students. As technology comes in different features and characteristics, the users should know how to effectively use it by knowing its functions, capabilities and limitations. One question is worth asking: How does the use of technology in education affects the roles and responsibilities of teachers?

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The present study will examine how instructors with different level of technology use perceive their job characteristics and work outcomes. In other words, would the job characteristics of instructors with low use of technology be different from those who opt to use it extensively. For example, an instructor who delivers teaching materials using more of conventional methods such as overhead projector, paper notes and whiteboard would need lesser skills than the one who uses electronic media such a CD ROMS, electronic bulletin and Web sites. The latter should be able not only to use the technology but to choose which medium that is right and effective to deliver teaching.

Housego and Freeman (2000) contend that teachers have to be able to implement good teaching strategies when they use technology in their teaching practice. For instance, online instructors should acquire new skills and they should be conscious of the potential of the technology as a learning enhancer tool. In a traditional classroom settings, teachers uses both verbal and non-verbal communication such as gestures, eye contact and posture in delivering their lecture to the students. In contrast, instructors who try to use the same approach in e-learning environment may face difficulties as these non-verbal communications are absent (Newble and Cannon, 1994).

Oliver and McLoughlin (2001) note that teachers' role has become directive and more facilitative as teaching and learning approach has slowly shifted from teacher-centered to student-centered. The existing course content can be expanded or modified by incorporating references to current events or by including new information (Harasim, Hiltz, Teles, Turoff, 1995). Adding more links to other internet sites for the students helps to enrich teaching resources and to add content. Use of technologies in teaching and learning may have significant impacts on lecturers' job characteristics and their work outcomes.

## **2. LITERATURE REVIEW**

### **2.1 Technology Application in Tasks and Responsibilities of Instructors**

In general, instructors' tasks and responsibilities are the same. However, when an instructor chooses to use technology, his or her role would somehow be different. Being a facilitator for a group discussion in a classroom requires the person to lead, consult, guide and be the resource person. The facilitator and students can physically interact with each other. But if the facilitator applies instructional technology in performing the task, the discussion will not necessarily be conducted in the physical classroom as it can also be conducted online. Subsequently, there will be a lack of non verbal cues and physical interactions among students. The facilitator is also unable to control the discussion physically. This limitation can be overcome by the right use of technology. For instance, non verbal cues can be replaced with emoticons, various text colors and types. On the other hand, in order to control the discussion and to ensure the students are actively involved, the facilitator can mediate the discussion by posting probing questions, offering comments and personally asking each and every student to participate. The facilitator should know how to use the communication tools and to be familiar with computers and the programs it is running.

According to Oldham and Hackman (1980), when responsibility and roles of an employee are increased, they provide autonomy and freedom as to how the person can schedule the work and determine the procedures to be used in carrying out the tasks. As autonomy increases, the person will feel more personally responsible for successes and failures. In this context, it is axiomatic that teachers are given the autonomy to formulate lesson plan, evaluate students' performance, select texts and other materials, develop curriculum and determine teaching methodology (Reed et al, 1998). Inherently they are also responsible to develop the cognitive skills of the students by the use of various teaching media. The more autonomy teachers have in making decisions important to their teaching, the more likely they are to have positive image of their role. Teachers whose job performance involves the use of technology should understand the different functions and characteristics of technology and to choose the right tool to deliver the learning materials to students. However, according to Salmon (2000), they do not have to master the technology. This view is supported by other researchers (Davidson, Schofield & Stocks, 2001; Margerum-Leys & Marx, 2002; Songer et al., 2001; Zhao & Cziko, 2001) who concur that being a competent technology user is different from knowing how to use it effectively. Given the freedom to choose, they should at least know which technology to use for effective teaching under different circumstances. The role of e-learning instructors has become less directive and more facilitative (Oliver and McLoughlin, 2001). This new role represents an important change to the dominant teacher-centered lecture model (Harasim et al, 1995).

Given the various tasks such as teaching, facilitating, mentoring, counseling and managing resources, instructors would definitely require various skills and abilities. These tasks require multiple skills such as skills in pedagogy, communication, interpersonal and management. Given the variety of tasks and skills required, teachers need to have the knowledge of the results of their work. The use of instructional technology will increase the necessary skills in performing the job and it makes the tasks of teachers more challenging. Students' evaluation on teaching performance is a good source of feedback of how well teachers are performing. After nearly seven decades of research on the use of student evaluations of teaching effectiveness, it can be safely stated the majority of researchers believe that student ratings are valid and reliable (Wachtel, 1998). Other way of soliciting feedback is from students' academic performance throughout the study period. The use of emails and online assessment may give immediate feedback to the teachers. Thus, it is interesting to know whether teachers who use technology will get better and faster feedback than those who do not use the technology.

## **2.2 Technology and Job Characteristics**

Much has been written on the impact of technology on job attributes and requirement in various industry settings. Majority of scholars concur that the use of technology in job performance enhances the skill requirement, job complexity, job challenges, feedback, autonomy and independence of workers. Studies conducted by many scholars (for example Blauner, 1964; Zisman, 1978; Riche, 1982; Millman and Harwick, 1987; Collins and King, 1988) find that technology and automation increases operators' skills and enhances the opportunity to learn. However, there are studies that yield opposite

findings. The use of technology is viewed as reducing the skill and autonomy of employees. This view is supported by many researchers (Kraft, 1977; Shaiken, 1986; Menzies, 1982). Their reason for this phenomenon is that management has the need to maintain the level of control at the top.

In the education setting, much has been written on the impact of technology on instructors' skills but studies that specifically look into the impact of technology on their job attributes are still lacking. Several scholars (Mason, 1991; Barker, 2002; Goodyear et al. 2001) view that instructors or teachers who use more advanced technology in teaching and learning should acquire more skills and perform more tasks as compared to those who use lower level technology. Their discussions revolve around four instructors' major roles; *pedagogical, managerial, technical* and *subject design*. The performance of these roles requires different level of job complexity and challenges given the different teaching and learning environment that changes the amount of physical interaction, the methods to impart knowledge and the access into learning materials.

### **2.3 Technology and Work Outcomes**

Zisman (1978) and Riche (1982) report that technologies like office automation, robots, microelectronics and telecommunications have increased employees' productivity and improved quality. Further, Rubenowitz and Rundblad (1987) find the use of computer systems and monitors increase not only productivity but employee satisfaction alike. Middle managers perceived automated office system makes their job more enriching and satisfying (Millman and Hartwick, 1987). Although Millman and Hartwick do not include internal motivation as one of the work outcomes, as proposed by Oldham and Hackman (1980) that jobs that are enriched would lead to high internal motivation, it can be assumed that the managers may be internally motivated as well. However, the relationship needs to be further examined. Evidences from the past findings lead to assumptions that instructors who use advanced technology for teaching and learning such as Power Point slides, computers, videos and web based resources would experience higher job satisfaction, internal motivation and improved performance than those who use less advanced technology. However, it should be noted that Gamst and Otten (1992) find no significant difference in terms of job satisfaction between employees using high technology and low technology. Studies that look into the impact of technology use among instructors are still sparse and thus, a close examination is needed.

Much has been written on the influence of job challenges and complexity of teachers on work outcomes. Studies have been conducted to study teachers in lower and higher level of education. A study that looks into factors contributing to job satisfaction in higher education is by Iacocca and Schumacher (1995). The results show that university teacher job satisfaction is significantly related with the challenges in the job, various skills required to perform the job and the financial support for research. Teachers and instructors are internally motivated by internal rewards such as wanting to be helpful, having a sense of making differences, feeling satisfied with interaction with students,

having autonomy and independence and feeling a sense of competence (McKeachie, 1997). In his study that comprises teachers from 23 universities in the United Kingdom, Oshagbemi (1997) finds majority of the respondents are satisfied with their teaching and research functions. Teachers have the sense of freedom to make important decisions that control certain aspects of their work life such as scheduling, curriculum, textbooks and instructional planning (Kleckler and Loadman, 1996).

A survey conducted by Kim and Loadman (1994) that involved 2054 teachers indicated that teacher job satisfaction is associated with intrinsic and extrinsic rewards. Intrinsic rewards are the professional autonomy and job challenges, interaction with colleagues and students. Extrinsic rewards associated with satisfaction are working condition and salary. The findings are further supported by a survey done by Kleckler and Loadman (1996) when a high positive linear correlation was found between a teacher empowerment and teacher job satisfaction. However, all these studies only involved teachers and instructors teaching in the traditional environment that do not use much of more advanced technology such as e-learning methods. Therefore, there is a need to study how instructors teaching in e-learning environment perceive their job characteristics and how their jobs influence the work outcomes.

## **2.4 Problem Statement**

Different level of technology use in teaching and learning has somehow influenced the practice of instructors. In UNITAR, some instructors choose to use technology extensively and some others do not. It is interesting to examine whether this factor has any impact on their job attributes and work outcomes.

The literature has extensively discussed teachers' job characteristics and the work outcomes and the findings are indicative that the job characteristics contribute to teachers and instructors' motivation, satisfaction and effectiveness (Iiacqua and Schumacher, 1995; McKeachie, 1997; Oshagbemi, 1997; Kleckler and Loadman, 1996; Kim and Loadman, 1994). However, all these findings cannot be generalized to all instructors and teachers as more and more institutions are using new technologies to facilitate teaching and learning. Given the new methods and environment, it is thus interesting to examine whether the same impact can be seen in those who are teaching in the e-learning environment.

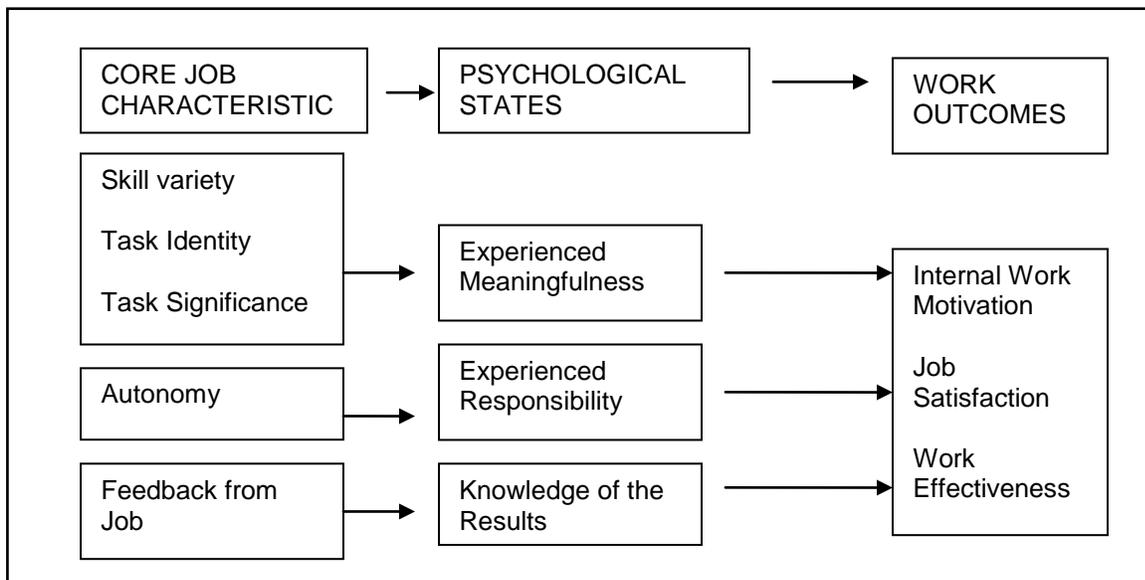
## **3. Research Objectives**

The objectives of the study are:

1. To examine the relationships between job characteristics and psychological states of e-learning instructors in general.
2. To measure the relationships between psychological states and job outcomes of e-learning instructors in general.
3. To examine the differences in job characteristics and work outcomes between instructors with low and high use of technology.

#### 4. Theoretical Framework

The present study aims to examine the relationship between instructors' job characteristics and the work outcomes. It employs the Job Characteristics Model (JCM) developed by Hackman and Oldham (1980) (refer to Figure 1). This model has been used by other researchers in their studies that examine the relationship between job characteristics and motivation in different work settings and economic sectors (e.g. Stone, 1976; Fox and Feldman, 1988; Kiggundu, 1980). The suitability of this model for education sector has been tested by Barnabe and Burns (1994). The researchers who tested the usefulness of JCM and the Job Diagnostic Survey (JDS) instruments in the field of education found that the model and the instruments provide a useful diagnostic tool.



Source: Hackman and Oldham (1980), p. 90

Figure 1: The Job Characteristics Model

According to Oldham and Hackman (1980), there are five different job attributes that influence employee motivation; 1) *skill variety*; 2) *task identity*; 3) *task significance*; 4) *autonomy*; and 5) *feedback*. Oldham and Hackman proposed that the first three characteristics contribute to the *overall meaningfulness of the job*. *Experienced meaningfulness* of a job is when a person feels that his job performance has a significant impact on the safety or well being of others. For instance, an instructor who is in e-learning environment has to be able to facilitate online discussions, design online course materials and use computer technology to perform his job. This would require more skills and new responsibilities that may influence his work outcomes.

An employee who is given more *autonomy* or freedom in how he wants to conduct a job will get the feeling of *experienced responsibility*. For example, an instructor is given the freedom to decide important matters pertaining what tools or methods to use for his

class but subsequently he will also be personally responsible for any failure or success of the learning activity.

Finally, *feedback* from the job gives an employee the information of how good or bad he is performing. Such information provides the person with the *knowledge of the results*. In the traditional learning environment, instructors get the feedback from students' physical reactions such as their participation in class and academic performance. In e-learning environment, feedback from the job can be enhanced because instructors can gauge the level of his performance by looking at the students' access into online course materials, the length of online forum discussion and students' interaction in a particular online tutorial. According to the authors, a job that is high in motivating potential must be equally high in at least one of the three characteristics that prompt experienced meaningfulness, and high on both autonomy and feedback. The three psychological states in turn would influence the level of motivation, satisfaction and effectiveness.

## **5. Research Methodology**

### **5.1 The Setting**

The research is based on the survey of instructors in Tun Abdul Razak University, Malaysia (UNITAR). There are 4 different branches in these states; Johor, Kelantan, Kedah and Selangor. The scope of the study only covers instructors in Selangor. The university is currently using e-learning method where majority of courses offered are supported with a courseware in the university learning database. To that end the university utilizes a system called 'Virtual Online Instructional Support System' (VOISS) as a platform where both instructors and learners could interact, provide and gain access to course materials such as lecture notes, power point slides, online forums, quizzes, assignments and course announcement. Classes are conducted in two modes namely face-to-face and online tutorials (OLT). Email addresses of instructors, tutors and students are also provided for exchanging and transmitting information purposes. Administrative functions are also conducted online such as course registration and the release of examination results. The UNITAR learning model prescribed for a minimal contact hour between student-instructor. Instead students are expected to be able to do self study using the materials provided in VOISS during the interval from one face to face class to another. However given the timeless nature of the technology, the instructors are always available for consultant via e-mail, telephone, Q&A forums and sometimes instant messaging services such as Yahoo Messenger.

### **5.2 Research Instrument**

The data is collected by distributing survey questionnaires among the instructors in UNITAR. The questionnaire is divided into three sections; Section A asks on demographic profiles of respondents; Section B asked on the perceived job characteristics, psychological states and work outcomes; and Section C asked on the level of technology use for teaching and its perceived usefulness. Items for Section B are based on the Job Diagnostic Survey (JDS) developed by Oldham and Hackman

(1980). However, one variable outcome (i.e. perceived work effectiveness) is self developed by the researchers as the JDS does not provide the measurement. Section C that elicited respondents' feedback on their use of technology such as email, online materials, digitized resources and computers. The questionnaires are self administered by the researchers. Each faculty was personally visited and to encourage participation, tokens were given as appreciations.

**5.3 Sample**

One hundred and fifty questionnaires were distributed to all the faculties in UNITAR; Faculty of Business Administration (FBA), Faculty of Humanities and Social Sciences (FHSS), Faculty of Information Technology (FIT) and Centre for Languages and General Studies (CFLGS). 52 respondents returned the completed survey forms.

**6. Data Analysis**

**6.1 Demographic Analysis**

A total of 150 copies of questionnaire were distributed to lecturers in the four faculties in the university campus in Selangor. Figure 2 summarizes the respondents' demographic description.

Gender: Male (21.2%), Female (78.8%) Average age: 35.69 years Average Teaching experience: 9.5 years Average Years of Teaching in UNITAR: 4.5 years	Faculties: Business Administration: 50% Information Technology: 26.9% Humanities & Social Sciences: 17.3% Language and General Studies: 5.8%
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Figure 2: Sample Demographic Description

**6.2 Reliability of Measurement Items**

Factor analysis was used to cluster the 45 items in Section B into relevant variable groupings. Reliability test was then done on the variables. Table 1 below illustrates the items found relevant for each variable and the reliability of the variables:

Table 1: Factor Analysis and Reliability Test Results for the Variables

Variables	Items	Cronbach Alpha Scores
Skill variety	My job requires doing many different things at work that use variety of skills My job requires a number of complex or sophisticated skills. My job is simple and repetitive (reversed scored)	0.660
Task identity	My job involves doing the whole piece of work from the beginning to end. My job provides me the chance to finish completely any work that I start. The results of my job activities can be easily seen in the final product or service.	0.768
Task significance	The outcomes of my work affect other people in very important ways. People are affected by how well the job is done. My job is very significant in the broader scheme of things.	0.845
Autonomy	My job allows me to decide on how to go about doing the work. I am completely responsible for the decisions on how and when the work is done. My job gives me the chance to use personal initiatives or discretion in carrying out the work.	0.641
Feedback from job	My job is set up so that I get almost constant feedback about how well I am doing. My job itself provides many chances for me to figure out how well I am doing. My job itself provides very few clues about whether or not I am performing well (reversed scored)	0.703
Experienced meaningfulness of work	The work I do is very meaningful to me. Most of the things I have to do on this job seem useless and trivial. (reversed scored) Most people on this job find the work very meaningful.	0.736
Experienced responsibility	I feel a very high degree of personal responsibility for the work I do on this job. I feel I should personally take the credit or blame for the results of my work on this job. Whether or not this job gets done right is clearly my responsibility.	0.719

	Most people on this job feel a great deal of personal responsibility for the work they do. Most people on this job feel that whether or not the job gets done right is clearly their own responsibility.	
Knowledge of results	I often have trouble figuring out whether I am doing well or poorly on this job. (reversed scored) Most people on this job have trouble figuring out whether they are performing their work. (reversed scored)	0.833
Job satisfaction	Generally speaking, I am very satisfied with this job. I am generally satisfied with the kind of work I do on this job.	0.766
Work motivation	My opinion of myself goes up when I do on this job well. I feel a great sense of personal satisfaction when I do this job well.	0.841
Work effectiveness	I am highly effective in teaching the content in my course. I am among the very best teachers at my school. My students would rate me as one of the very best teachers they have ever had. All my students would evaluate my courses as excellent. I stay current with the latest news and development in my field of expertise.	0.823

### 6.3 Findings on Job Characteristic, Instructor’s Psychological States & Job Outcomes

Pearson correlation analysis was used to measure the relationship between skill variety, task identity, task significance (these three were grouped to form an index of overall job meaningfulness), autonomy and feedback from job with the respondents’ psychological states. Correlation analysis was also used to determine the relationship between psychological states, namely experienced meaningfulness, experienced responsibility and knowledge of results with three dimensions of job outcomes i.e. motivation, satisfaction and work effectiveness. Table 2 below summarizes the findings of the analysis.

Table 2: Summary of Correlation Analysis

Independent Variable	Dependent Variable	P-value	Significant relationship*
Overall meaningfulness index (skill variety + task significance + task identity)	Experienced meaningfulness	0.016	Yes
Autonomy	Experienced responsibility	0.05	Yes
Feedback from job	Knowledge of results	0.68	no
Experienced meaningfulness	Work Motivation	0.009	yes
Experienced meaningfulness	Job Satisfaction	0.007	yes
Experienced meaningfulness	Work Effectiveness	0.023	Yes
Experienced responsibility	Work Effectiveness	0.248	No
Experienced responsibility	Work Motivation	0.104	No
Experienced responsibility	Job Satisfaction	0.003	yes
Knowledge of results	Job Satisfaction	0.065	no
Knowledge of results	Work Effectiveness	0.009	yes
Knowledge of results	Work Motivation	0.067	no

*\*All are tested at alpha=0.05*

#### 6.4 Use of Technology and Its Perceived Usefulness in Teaching

Table 3 shows the level of technology usage and its perceived usefulness in percentage from high to low. Next, the relationships between use of technology and the perceived usefulness are tested using Pearson correlations. The findings for this section are summarized in Table 3 below:

Table 3: Use of Technology and Its Perceived Usefulness Among Instructors

Technologies	Perceived Usefulness (%)			Level of Usage (%)			Correlation (P value)*
	High	Medium	Low	High	Medium	Low	
Lecture	96.2	3.8	0.0	90.2	9.8	0.0	0.001
Email	94.2	5.8	0.0	78.8	15.4	5.8	0.000
OLT	53.8	19.2	27.0	30.8	32.7	36.7	0.000
MsOffice	100.00	0.0	0.0	88.5	5.6	5.7	0.000
Internet	98.1	1.9	0.0	84.6	5.8	9.6	0.000
LCD	98.1	1.9	0.0	80.8	9.6	9.6	0.000
CDRom	57.7	19.2	23.1	23.1	19.2	57.7	0.037
Audiotape	23.1	21.2	55.7	7.7	23.1	69.2	0.465
Video	23.1	32.7	44.2	11.5	38.5	61.5	0.402
Messaging	25.0	25.0	50.0	15.4	7.7	78.9	0.000
Courseware	76.9	15.4	7.6	55.8	23.1	21.1	0.000

\* All correlations are tested at  $\alpha=0.05$

Pearson Correlation analysis between the respondents' perception on the usefulness of technologies in their teaching and learning activity and the actual level of usage of technology suggests a significant correlation between the two for all types of technologies except audiotape and video. Of the 11 technologies listed, the respondents perceived MsOffice, the internet and LCD projector as the most useful technologies while MsOffice and the internet were ranked the most used technologies respectively. Another interesting finding is even though lecturers perceive that OLT and CD-ROMs as useful for their teaching, the technologies are not frequently used.

### 6.5 Use of Technology and Respondents' Demography

One-way ANOVA and Chi-Square test was used to test the relationships between six demographic variables and the level of technology usage. The two most used technologies (MsOffice and the internet) were grouped to form an index (labeled as MsOffice/Internet index) and tested against age, years of teaching experience, years of teaching in UNITAR, experience teaching in conventional universities, faculty and area of specialization. Refer to Table 4.

Although not ranked as among the most highly used in teaching and learning activity, OLT is one of the unique features of UNITAR as an e-learning institution. Therefore, the level of OLT usage was also tested against the abovementioned demographic variables. Table 4 shows the summary findings of the all the mentioned tests:

Table 3: Relationships between Use of Technology and Respondents' Demography

	MsOffice/Internet Index		OLT	
	P value	Significance	P value	Significance
Age	0.001	Yes	0.075	No
Years of teaching in UNITAR	0.750	No	0.205	No
Years of teaching experience	0.343	No	0.709	No
Experience teaching in conventional university	0.204	No	0.073	No
Faculty	0.206	No	0.002	Yes
Specialization area	0.719	No	0.008	Yes

The findings show that the only demographic variable that has a significant relationship with the level of technology usage is age. The respondents' teaching experience, his or her year of service in the university, the faculty to which he or she belongs to and the area in which he or she specializes in do not determine the level of technology usage. For OLT on the other hand, faculty and area of specialization were found to be related to the level of OLT usage

**6.6 Use of Technology, Job Characteristics and Work Outcomes**

The three psychological states of job characteristics and the work outcomes were tested against the perceived usefulness of two of the most used technology (MsOffice and the internet) and the actual level of usage of both technologies. It is surprising to see the very low correlations. Significant relationship was only found between the level of both technologies' usage and experienced responsibility (P=0.024). The P value from the one-way ANOVA analysis of perceived technology usefulness and work effectiveness to experienced responsibility, job meaningfulness, knowledge of results, job satisfaction and internet motivation ranged between 0.133 to 0.957; showing no significant relationship.

**7. Discussions and Conclusion**

**7.1 Job Characteristics, Psychological States and Work Outcomes**

The study attempted to examine the relationship between job characteristics and the psychological states on the work outcomes. Even if some of the findings were found inconsistent, most of the findings provide support to the previous ones (Oldham and Hackman, 1980, Barnabe and Burns, 1994, Ellis, 1986). As expected, the job characteristics are significantly related to their respective psychological states except for

feedback from job and knowledge of results. This is possibly due to the manner and time lecturers get feedback from their job. With regards to time, lecturers will usually find out the effectiveness of the class and his teaching strategy a few weeks into the semester because this is when quizzes and tests are conducted. Students who are not performing well are normally identified after these tests are conducted. Sometimes, students may be showing great interest in class and exhibiting good discipline but that alone may not be a good indicator of their academic performance that is normally measured using tests, examinations and assignments. In respect of manner of feedback, the university employs a Teaching Evaluation Report (TER) which is distributed to the students for them to give their evaluation of the lecturer and course materials. The TER score is usually made known to the lecturer quite late after the semester has ended and the results were convey in nature of numbers and percentage. This may explain why lecturer does not view knowledge of result to have any impact on job satisfaction due to the impersonal nature of the feedback compared to if the lecturers were to receive personal and candid comments from the students. This may also explain why lecturers perceived they are getting feedback about their work but at the same time are facing difficulty in figuring how good they are in improving students' academic performance.

Significant relationships are found between skill variety, task significance and identity and their psychological state; experienced meaningfulness; and between the state and all the work outcomes. These findings are consistent with the previous studies (Oldham and Hackman, 1980; Iacocca and Schumacher, 1995). This could be due to the various skills needed to perform their job that require the ability to use variety of teaching devices and tools. In UNITAR, some students may not be familiar with technology and online resources. They would require support and assistance from lecturers. Given the wide range of resources available for teaching and learning, lecturers have to be able to evaluate the limitations and capabilities of each technology or tools so that learning objectives can be achieved. Bates (1995) contended that there is no 'superior' technology as each has its own strength and weaknesses. It depends largely on each individual lecturer's personal choice and preference, based on his experience, competency and comfort level with a particular technology.

Experienced responsibility is only found significant with job satisfaction and not to work effectiveness and motivation. Insignificant relationship with internal motivation is unexpected as it is inconsistent with previous studies (Khmelkov, 2000; White, 1992; Wilson; 1993). This may indicate the sense of responsibility they have in their teaching practice does not contribute much to their internal motivation and the perceived work effectiveness. The lecturers may be satisfied with the job because of the high responsibility they have to carry in their work. Being given various alternatives of technology to perform their work such as traditional and advanced teaching devices, they are responsible to determine the right type of media or tools to be used as these devices have their strengths and weaknesses. However, if they perceive their effort as less effective in resulting excellent performance, this may somehow reduce their motivation.

Another interesting finding is knowledge of results is only found significant with perceived work effectiveness and not with satisfaction and motivation. Lecturers may perceive they have done a good job but that alone may be insufficient in fostering their internal motivation and satisfaction. Maybe other factors should be looked into such as tangible rewards that could be less satisfying and motivating. As noted by Dubitskii (2005), behavior and commitment of lecturers are influenced by many underlying factors. They may be driven more by external gains or they may be given very limited opportunity in getting these rewards. Factors like pay, promotion, work environment and other organizational policies should be given consideration as well.

## **7.2 Use of Technology**

Table 3 indicates the use of different types of technology in teaching and their respective perceived usefulness. Given the wide range of technologies available for teaching, most lecturers are keener in using certain technologies such as E-mail, Microsoft Office, Internet and LCD projector. As expected Microsoft Office is highly used by all the respondents since all lecturers have their own personal computer and use them regularly in preparing for lectures and course assessment. High use of emails is expected as it is the most popular channel of communication in the university.

The use of Internet is also very high as lecturers are expected to enrich and supplement teaching and learning resources by using materials that are published online. In regards to the use of online tutorial (OLT) to complement face-to-face classes, this technology is not frequently used. This may be explained by the technical difficulties faced by instructors and students. It is common to receive complaints such as server downtime, no connectivity, and difficulty to logon from the users. Lecturers may find it very difficult to use online tutorial as they find it easier to deliver the lecture in a physical classroom. The use of multimedia such as CD-ROM is also very low. This can be explained with the shift from CDs to courseware as the channel to deliver learning materials. However, lecturers are still using CDs especially for teaching preparations as most instructors manual are available in CD format. Despite the low use of audio tapes and video tapes among the lecturers, those who are teaching language subjects are still using them.

## **7.3 Use of OLT and CD-ROMs**

Significant correlations between the perceived usefulness and actual use of technology of all the technologies (except for audiotape and video) indicate that lecturers perceive that all the technologies are useful in their facilitation of teaching and learning. The use of various media enhances the quality of teaching delivery and students' learning. All the facilities are available in UNITAR and lecturers have no problem to have access. However, two types of technologies; OLT and CD-ROMS that are perceived as useful in teaching are not actually used by lecturers. There are two possible reasons as explanation. One, even if OLT facility is available for use, lecturers are not motivated to use it. They perceive that OLT is useful but technical difficulties encountered during the online session have led to frustration among the lecturers and the students. Thus OLT remain unused. Table 3 also indicates that the use of OLT is significantly related to the

type of faculty and area of specialization. In UNITAR, some faculties make it compulsory for instructors to use OLT. Thus, other faculties which are lax in its application result in low use of OLT.

Areas of specialization in UNITAR vary from quantitative, qualitative and technical areas. Quantitative area offers courses that involve numbers and calculation unlike those in qualitative area. It is indicative that OLT maybe useful and effective in facilitating subjects in certain areas such as qualitative. Quantitative and technical subjects like Mathematics, Accounting, Finance and Programming may not be effective if delivered online.

CD-ROMs is also perceived as useful but it was given low ratings in terms of actual use. The explanation is simple; CD-ROMs are generally well accepted as effective medium to deliver teaching materials but its use in UNITAR has been diminished as it has been replaced with online notes (courseware).

#### **7.4 MsOffice and Internet**

Table 3 shows that the use of MsOffice and Internet are only significantly related to respondents' age and not to other demographic factors. The respondents' age ranges from 29 years to 59 year. Majority of them are below 35 years. This may indicate that age may play a role in influencing the use of these technologies.

#### **7.5 Technology, Job Characteristics and Work Outcomes**

The findings that yield insignificant relationships between level of technology use and job characteristics and work outcomes are unexpected. The test results only show that the technology use (MsOffice and Internet) is only significant to experienced responsibility. This may be explained by the role of lecturers in choosing the right materials for students from the Internet. Given the wide variety of sources in the World Wide Web, lecturers are free to roam, explore, assess and choose the appropriate sources and materials to support the teaching and learning activities. MsOffice is mainly used by lecturers to deliver the teaching materials and for students to perform course works. The ability of lecturers choose the appropriate tools such as power point slides, word processor, charts and graphs would somehow provides the sense of responsibility to them in ensuring that teaching materials are delivered effectively. Insignificant relationships that were found between perceived usefulness of technology and the three psychological states and work outcomes are surprising.

Since most relationships were found insignificant, further studies are required to examine the relationships. The study suffers mainly from the small sample size (52 respondents) and it only represents 33% of the whole population. Thus, inferences and interpretations are to be made with great caution.

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