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SEARCHING FOR THE GOLD STANDARD: THE TIMES HIGHER EDUCATION WORLD UNIVERSITY RANKINGS, 2010-2014

Richard Holmes University Ranking Watch E-mail: rjholmes99@yahoo.com

ABSTRACT

This paper analyses the global university rankings introduced by Times Higher Education (THE) in partnership with Thomson Reuters in 2010 after the magazine ended its association with its former data provider Quacquarelli Symonds. The distinctive features of the new rankings included a new procedure for determining the choice and weighting of the various indicators, new criteria for inclusion in and exclusion from the rankings, a revised academic reputation survey, the introduction of an indicator that attempted to measure innovation, the addition of a third measure of internationalization, the use of several indicators related to teaching, the bundling of indicators into groups, and most significantly, the employment of a very distinctive measure of research impact with an unprecedentedly large weighting. The rankings met with little enthusiasm in 2010 but by 2014 were regarded with some favour by administrators and policy makers despite the reservations and criticisms of informed observers and the unusual scores produced by the citations indicator. In 2014, THE announced that the partnership would come to an end and that the magazine would collect its own data. There were some changes in 2015 but the basic structure established in 2010 and 2011 remained intact.

Keywords: rankings, universities, Times Higher Education, citations

INTRODUCTION ¹

The classification and ordering of colleges and universities are not new. As long ago as 1908 the Carnegie Foundation for the Advancement of Teaching created a list of 14 American institutions that were ranked according to the amount of money spent on instruction and would become the basis for Edwin Slosson's Great American Universities (Ballantyne, 2002). In the 1980s, the ranking of universities took on a new dimension when the US News & World Report (USN) started America's Best Colleges. This met a growing need for guidance for students across the United States who could no longer rely on advice from friends, parents and teachers (Wildavsky, 2010).

Rankings went international, although not yet global, when the Hong Kong based magazine, Asiaweek, published a ranking of Asian universities in 1999 with a second edition in 2000. This was a broad based index that assessed universities according to academic reputation, student selectivity, faculty resources, research performance, income, staff student ratio, number of postgraduate students, citations and internet bandwidth ("Asia's best universities", 1999, 2001) At the end of 2001, however, the magazine ceased publication something that its publisher, Time Incorporated, blamed on a decline in advertising revenue (Schwartz, 2001).

The origins of the first really global rankings, the Academic Ranking of World Universities (ARWU) produced by the Center for World-Class Universities at Shanghai Jiao Tong University, go back to 1998 when the Chinese president declared that the country needed a number of worldclass universities and Shanghai Jiao Tong University was one of those selected for this status. Liu Nian Cai, then a professor in the Chemistry and Chemical Engineering department at the university, worked on benchmarking with American universities, and this eventually led to the first ARWU in 2003 based on publicly accessible research data (Liu, 2009).

The Shanghai rankings caused quite a stir. They showed that the world of scientific research was dominated by English-speaking universities, especially those in the USA, while continental European institutions generally did poorly. In 2011 Edouard Husson, a former advisor to the French government, spoke about the consternation when no French institution reached the top fifty of the rankings (Myklebust, 2011).

A year after the first appearance of the Shanghai rankings, two more appeared. The Webometrics rankings used several Internet based indicators and had the virtue of ranking many more universities than ARWU or later rankings but the academic world and the public were not convinced that it was an accurate representation of quality.

In 2004, John O'Leary, then the editor of Times Higher Education Supplement (THES, renamed Times Higher Education (THE) in 2008), and Martin Ince came out with the first edition of the THES-QS World University Rankings. Ince, who was in charge of the rankings project, has said that THES was looking for international metrics that would capture academic quality, graduate employability, research, teaching and world reach (Ince, 2010). The indicators and their weighting were decided by THES but the collection of data was done by Quacquarelli Symonds (QS), a British company that until then had specialized in recruiting students for graduate business programmes.

Almost every aspect of the THES-QS rankings had some sort of problem. Among them was the collection of data from institutions to calculate the faculty student ratio, the percentage of international students and faculty and the number of citations per faculty. In many countries such data are not easy to come by.

It was also claimed with some justification that the citations per faculty indicator was rather crude since it took no account of disciplinary peculiarities with regard to the frequency and timing of citations and that the faculty student ratio was not a good proxy for teaching quality or the resources available for teaching. The latter was also subject to fluctuations as institutions and QS made errors, corrected errors and struggled with unclear definitions and administrative reorganization. The blog University Ranking Watch (Holmes, 2006a, 2006b, 2007) revealed how Duke University and École Polytechnique experienced dramatic changes in their positions as a result of errors in calculating this indicator.

It was, however, the academic opinion survey that aroused the strongest complaints. The response rate to the survey question was very low, probably because the database was full of duplicated names. Furthermore, it came out that the respondents were required to have no

more expertise than the ability to sign up for an online subscription. Over the years since 2004 the academic survey and the employer survey, which had a 10% weighting and was introduced in 2005, have evolved but few observers have much confidence in them.

In 2008, QS introduced a raft of changes that included standardization so that the curves for all indicators had the same shape, using Scopus rather than the Thomson Reuters (TR) databases as the source of citation data, and imposing restrictions on survey respondents voting for their own institutions.

Methodological changes combined with errors and correction of errors, changes in the distribution of survey responses and the entry of new universities into the rankings with concomitant changes in the means from which indicator scores were calculated ensured that the THES-QS rankings were unstable, with some universities rising or falling dozens of places over the course of a single year. It should be noted, however, that the QS world rankings have become more stable over the last few years (Holmes, 2014). There was also concern about the QS Stars system where universities pay QS for an audit that results in the award of one to five stars.

Despite methodological changes, criticism mounted and penetrated into the power structure of the THES, which was evolving from a traditional weekly newspaper into a magazine. After a change of ownership in 2005, the publication was renamed Times Higher Education in 2008. During 2009 the THE editorial team reviewed the rankings and in October announced that it was ending its partnership with QS and would turn to TR to produce a new set of rankings (Baty, 2010a, 2010b, 2010c, 2014).

The new THE rankings were an ambitious project, purporting to be "robust, transparent and sophisticated" and "the most exact and relevant world rankings yet devised" (Baty, 2010d, para. 1). It became clear, however, that there was a contradiction between the need for consistency and stability and the drive for accuracy and validity. While THE did win the approval of the elite universities of the UK and continental Europe, it is debatable whether they had in fact created rankings that could accurately be described as exact and relevant.

THE FIRST EDITION OF THE TIMES HIGHER EDUCATION WORLD UNIVERSITY RANKINGS 2010

The new THE rankings that finally emerged in the autumn of 2010 had several distinctive features.

Choice and Weighting of Indicators

Previously, the weighting of the various indicators appeared to be arbitrary or perhaps influenced by the convenience or commercial interests of the publishers. THE, however, went to considerable lengths to consult with a wide range of views and approaches. During the months that followed the separation from QS, they began a series of discussions and consultations about the form that the new rankings would take. In a comment on 1 December 2009 at the University Ranking Watch blog, Phil Baty, THE Rankings editor, wrote that THE wanted to "to start from scratch and develop a new rankings methodology in direct consultation with the international university community" (as cited in Holmes, 2009, n. p.). THE opened an online survey for academics and administrators, started a platform group to consult with major universities and tapped the advice of its editorial board, which included figures such as Philip Altbach, head of the Centre for International Higher Education at Boston College, Drummond Bone, a consultant on international higher education and Bahram Bekhradnia, director of the Higher Education Policy Institute (Holmes, 2009).

The structure of the rankings that eventually emerged in the autumn of 2010 was influenced by the opinions of academics at highly regarded institutions and seemed to mark a shift towards research intensive, industry linked, internationally orientated universities that emphasized doctoral supervision rather than undergraduate teaching or taught master's courses.

THE also considered input from some of those who had been criticizing the rankings. Phil Baty, for example, has gone on record as taking account of the suggestions from the editor of University Ranking Watch that the weighting given to teaching related components be increased and that for international students reduced. He also noted that Ian Diamond of the University of Aberdeen had been a keen supporter of

field normalization of citations data and that the new rankings would take note of his views (Baty, 2010a).

Other factors came into play. The original intention was that the weighting given to reputation surveys should be reduced but it turned out that institutional data was not always reliable and so the reputation survey with two questions about postgraduate teaching and research ended up with 34.5% of the total weighting. Income from industry, which at one point was supposed to have 10% of the weighting, was in the end given only 2.5% because many universities were unable to come up with the relevant data.

At the beginning of 2010, THE published the first draft of its proposed new methodology, which was then sent out to members of the advisory board and the platform group.

After this round of consultation, a revised structure emerged, which and it was announced on 2nd September. The first difference was that weighting of the income from industry indicator was reduced from 10% to 2.5% because it was self-reported data and hence not always reliable. In 2010 and in later editions of the rankings, it was noticeable that several US universities, including in 2014 the University of Minnesota, Indiana University and UCLA were given blank spaces for this indicator and received an adjusted score based on the other indicators.

The 55% allocated to research was now increased to 62.5% divided between 30% for Research: Volume, Income and Reputation, which included five indicators and 32.5% for Citations.

To allocate nearly a third of the total weighting to citations was unprecedented and to choose only one of the many ways of measuring citations was surprising. It is a reasonable inference that the interests of TR, whose InCites system for staff evaluation depended on the calculation of impact factors normalized by field and year, played a disproportionate role in the choice and weighting of indicators.

Inclusion and Exclusion

Ranking organizations have taken different approaches to the number of institutions that qualify for ranking. At one extreme is Webometrics, which now ranks over 25,000 universities, using publically accessible data. Other rankers have been much more selective.

When the Shanghai ARWU rankings were developed, the Center for World-Class Universities deliberately relied only on publicly available information and took no account of whether any university wished to be in the rankings or not. The Shanghai rankers started with all universities whose staff or alumni had won Nobel prizes or Fields medals, employed a highly cited researcher, published a paper in Nature or Science or had a significant number of papers in the Science Citation Index-Expanded or the Social Science Citation Index.

The THES–QS rankings adopted a somewhat different approach. They started with the top three hundred universities by research output then added a number of universities that were thought worthy of inclusion because they published significant research in languages other than English and those included in the Asiaweek rankings. After that, universities have been considered on a case by case basis but once included are not allowed to withdraw. Should a university decide not to submit data then QS uses old data or data from websites, government agencies or third party sources (Sowter, 2008). The number of ranked universities has risen from 500 in 2004 to 566 in 2007, 834 in 2013 and 907 in 2015 (Topuniversities, 2009, 2013, 2015).

TR and THE decided that universities must submit current data if they wished to be included in the THE rankings and there were no substitutes for self-submitted information. They were taking a risk here since it was precisely this policy that contributed to the end of the Asiaweek rankings and it did seem during the first year of the new rankings that THE and TR heading for trouble.

When the THE rankings came out in 2010, those absent included the Chinese University of Hong Kong, the University of Queensland, Tel Aviv University, the Hebrew University of Jerusalem, the Francophone Catholic

University of Louvain, Fudan University, Rochester, Calgary, all of the Indian Institutes of Technology, Sciences Po Paris, and the University of Texas at Austin. The omission of the two leading Israeli universities was apparently the result of some sort of misunderstanding with the request for data not reaching the right person (Schtull-Traurring, 2010).

A Faculty Council meeting at The University of Texas (UT) at Austin provided insight into why some universities were reluctant to take part in the new rankings and also into how that initial reluctance was eventually overcome. Professor Thomas Palaima said that it was embarrassing that some American public universities had taken part while UT did not. Some had done well in the new rankings even though they had been slipping in the THES-QS rankings. Eventually UT decided to participate (University of Texas, 2011).

It should be noted that the THE rankings, like their predecessors, did not have a fixed membership and that the number of ranked universities could change as institutions opt in or drop out. One consequence of this is that the processed scores could change because mean indicator scores were changing.

The Reputation Survey

The academic survey was much more systematic and rigorous than QS's. The actual administration was done by the professional pollsters IPSOS Mori. Survey forms were sent to a selected target group, namely those who had published papers included in the Science Citation Index Expanded (SCIE), Social Sciences Citation Index (SSCI) and Arts and Humanities Citation Index (A & HCI). To top up the numbers in the social sciences and the arts and humanities some forms were sent to a sample of academics drawn from the IBIS Worldwide Academic and Library File produced by Mardev.

The number of forms sent to each country was decided according to the number of researchers there as found by UNESCO and provided in the Global Perspective on Research & Development report (UNESCO, 2010). The new survey also asked two specific questions about research and about postgraduate supervision (Global Institutional Profiles Project, 2010).

It was not possible at first to examine the results of the THE survey directly since they were bundled into two clusters with other research and teaching indicators. Later however, THE did issue separate reputation rankings and these seemed to be quite plausible. They did not contain the unexpectedly high scores for some Asian and Latin American universities that have been characteristic of the QS world rankings. It was also evident that after the first half dozen universities, the number of votes, and hence the scores, dropped precipitously so that a university's overall score might be influenced by small changes in the number of people supporting it in the survey.

Alex Usher of Higher Education Strategy Associates has reported research that indicates that the number of votes for universities outside the top 150 is usually likely to be no more than 40 and that small changes in survey responses can have a disproportionate effect on overall scores (Usher, 2014).

THE had originally proposed to drastically reduce the weighting given to the reputation surveys. It appears, however, that TR found that data from institutions was difficult to obtain and was not always reliable. The two reputation surveys, therefore, ended up having a more substantial weighting than had originally been intended. The teaching survey received 15% and the research survey 19.5%.

Structure of the Rankings

The new rankings dropped the THES-QS employer surveyor and did not attempt to find any other indicator of student quality. They also included a measure of innovation and engagement with industry, research income from industry, with a weighting of 2.5%. Another new indicator was public income as a percentage of total research income with a weighting of 0.75%.

The new rankings were also distinctive in that three of the five groups of indicators contained more than one indicator. International Mix included two indicators: International Faculty and International Students. The category of Teaching – the Learning Environment consisted of five indicators. One of these, staff student ratio had been included in

the THES-QS ranking but was improved by removing full time research staff from the staff side of the equation. Added to this were a reputation survey of postgraduate teaching, income per academic staff, PhD degrees per academic staff, PhD degrees per bachelor degrees, and undergraduate admissions.

The research indicator group included papers per academic and research staff, research income, public research income as a percentage of total research income and a research reputation survey.

The grouping of indicators in clusters meant that it would be very difficult, if not impossible, to figure out the causes of a university rising or falling in the rankings. If a university improved in the Teaching or Research cluster, for example, it could be because the university had done better in one or more of three or five distinct indicators.

The Citations Indicator

While the citations indicator stood alone without being combined with any others, there was a reduction in transparency here as well. Checking the citations per faculty indicator in the THES –QS and then the QS World University Rankings was fairly simple. The number of citations for each university over the relevant period could be checked with the Scopus database. The number of faculty could usually be found on university web pages, national databases or QS profiles.

This was not possible with the new indicator. TR used normalization by field and year. That meant each paper was compared with the world average for one of 250 possible fields in five years of publication and one, two, three, four or five possible years of citations. Calculating the world average for such a large number of citations per year per field would be impossible for anyone without TR's resources.

Previous world rankings had given a substantial weighting to citations. ARWU had an indicator with a 20% weighting that counted the number of highly cited researchers in the TR lists. QS had counted the number of citations per faculty and given it a 20% weighting. The new THE-TR citations indicator gave much greater prominence to citations (32.5%) than any previous rankings.

As we shall see, the normalization process used in the new THE rankings produced some very strange results that called into question the competence and objectivity of the rankers.

REACTION TO THE 2010 RANKINGS

The first edition of the new rankings was generally not well received. Its merits were submerged by the extraordinary placing of Alexandria University in Egypt in the top two hundred of the world's universities and in fourth place for research impact.

This said much about the narrow worldview of THE and TR. They seemed to have no idea that scholars and scientists in the Arab and Muslim worlds had a good idea of the general merits of universities in Egypt and its neighbors. THE produced a most unconvincing explanation that noted that a Nobel laureate had studied there decades ago before departing to the US and that there was once a famous library in the city two millennia before the foundation of the university. They had to admit, however, that the real cause was the writings and the citations of precisely one man (Holmes, 2010). This is where the story of the THE rankings intersected with a major scandal of academic publishing.

The man was Mohammed el Naschie, an Egyptian by birth and ancestry who had obtained a doctorate in engineering from University College London. He later started a journal, Chaos, Solitons and Fractals, devoted to the disciplinary borderlands where applied mathematics met theoretical physics. This eventually came under the imprint of Elsevier. El Naschie published several papers every year in the journal and in the International Journal of Nonlinear Sciences and Numerical Simulation which was then published by Freund of Tel Aviv and of which he was a regional editor, sometimes more than one in a single issue. In most of those papers, he cited other papers that he had written, many of them in the same year.

At this point, he was involved in a libel case against Nature that has since been resolved in the journal's favor. During the trial and judgment, it became clear that El Naschie's writings were largely devoid of academic merit (Cressey, 2012).

For the 2010 rankings, TR used the methodology they had developed for their InCites system which had been delivered to many universities around the world. We will look at the system later but essentially what it did was to greatly amplify the number of citations in fields that had few citations, especially if they tended to have few citations in the first one or two years after publication. This was what happened with El Naschie and his publications and citations.

There were many complaints from prominent academics and ranking experts. Philip Altbach of the Center for International Higher Education at Boston College remarked that "[s]ome of the rankings are clearly inaccurate. Why do Bilkent University in Turkey and the Hong Kong Baptist University rank ahead of Michigan State University, the University of Stockholm, or Leiden University in Holland? Why is Alexandria University ranked at all in the top 200? These anomalies, and others, simply do not pass the smell test" (Altbach, 2010, para. 19)

Paul Wouters of the Centre for Science and Technology Studies (CWTS) at Leiden University, commenting on an article by Guttenplan (2010) in the New York Times, said, "the way the THES uses citation analysis does not meet one of the requirements of sound indicators: robustness against simple forms of manipulation" (Wouters, 2010, para. 2).

The new rankings did have some tepid support from leading politicians and administrators. Among them was the UK Minister for Higher Education, David Willetts, who congratulated THE "for reviewing the methodology to produce this new picture of the best in higher education worldwide" (Times Higher Education, 2010, para. 10).

In the same issue of THE, Dirk van Damme, head of the Centre for Educational Research and Innovation at the Organization for Economic Cooperation and Development, hinted that the rankings might be positive on the whole. "Rankings are not perfect. They need to be improved continuously and they sometimes lend themselves to dreadful misuses. But they enhance accountability and transparency, they stimulate comparability and competition, and in so doing they strengthen the global system of scientific research and higher education. This is only the beginning and much more work needs to be done" (Van Damme, 2010, para. 17). Phil Baty (2014) has claimed that the response to the new rankings "was rich and encouraging" (p. 128). He reported that David Naylor of the University of Toronto had noted that THE had undertaken widespread consultations and that Ian Diamond of the University of Aberdeen referred to "sensible conversations that had led to positive changes" (p. 129). But on balance the criticism of the 2010 rankings was much louder than the praise.

CHANGES 2010 - 2011

There was little debate and no admission of serious error. THE and TR continued to insist most of the time that there were just a few statistical anomalies and that the basic system was sound. During 2010 and 2011, there was evidently a lot of discussion about changes to the ranking methodology, this time largely in private, which resulted in several significant changes (Baty, 2011a).

One change was that normalization, used in 2010 for the citations indicator, was now applied to the number of papers per academic and research staff, the number of doctoral degrees awarded and research income. This probably helped universities with strengths in the social sciences and reduced the scores of those with a high volume of medical research. Among other things, it contributed to a noticeable improvement for the London School of Economics. The exact effect of these changes is not clear since three indicators were still combined under the Research: Volume, Income and Reputation category.

There was also some redistribution of the weighting of the various components. Within the research cluster, the weighting for research reputation was reduced from 19.5% to 18% while that for research income per academic was increased from 5.25% to 6% and the volume of research per academic and research staff from 4.5% to 6%. The public research income as a percent of total research income indicator, which had accounted for 0.75%, was now deleted.

A new indicator measuring international research collaboration was introduced with a weighting of 2.5 %. The other two internationalization

indicators were realigned. Instead of 3 % for international faculty and 2 % for international students (Baty, 2010b), it was now 2.5 % for each.

TR also introduced a number of changes to the citations indicator. First, the period for which citations were counted was extended from five to six years. In addition, the threshold for ranking was raised from fifty to two hundred papers per year. The weighting for the indicator was reduced from 32.5% to 30% and finally, a "regional modification" was introduced, by which the normalized citation counts for universities were divided by the square root of the counts for the country in which they were located. In effect, universities would receive a substantial boost just for being in a low impact country. This may well have contributed to a few universities in countries like Turkey, Chile, Morocco and Italy getting remarkably high scores for the citations indicator.

REVIEW OF THE THE RANKINGS AFTER 2010

One distinctive feature of the rankings after 2010 was that uniquely among international rankings, they continued to bundle indicators together in groups with only the group score being given.

The indicator group Teaching – the Learning Environment contained five separate indicators: reputation survey of postgraduate teaching (weighting of 15%), PhD awards per academic staff (6%), undergraduates admitted per academic staff (4.5%), income per academic staff (2.25%), and PhD awards per bachelor awards (2.25%), making a total of 30% (Baty, 2011a). As noted above, a change in a university's score for this group of indicators could result from a change in the score for one or more of the component indicators. Similarly, the Research: Volume, Income and Reputation indicator combined scores for research reputation (18%), research income (6%) and papers per academic and research staff (6%) and, a change in the score for this indicator group could result from a change in one or more of three indicators.

The International Outlook: Staff, Students and Research indicator now had three components, each with a weighting of 2.5%, international students, international faculty and international collaboration. A rise in a

university's score could result from an increase in the number of international students or international faculty, a decline in the total number of students or faculty, an increase in the number of international collaborations, a reduction in the total number of publications, a decline in the mean score among ranked universities or some combination of any of these.

There were two indicators that stood alone, innovation: industry income and citations: Research impact. Each of these was problematical. It turned out that data for the income from industry indicator was not always available or reliable and that several universities were not scored and their total score was decided by the other indicators.

There were also serious problems with the citations indicator which continued to present problems for THE and TR after 2010. A major objective of the changes to this indicator was removing the embarrassment of Alexandria University. In this, THE and TR were apparently successful. The citations score for Alexandria fell from 99.8 to 61.4, which was still far ahead of its realistic and very modest research score of 7.8 but enough to relegate it from the overall top 200 to the 301-350 band (Times Higher Education, 2011).

The citations indicator however, continued to produce implausible if not downright ludicrous results. In 2012, the joint top universities for research impact were Rice University in Texas and Moscow Engineering Physics Institute (MEPHi). Rice as top university for research impact, rather than Caltech, Berkeley, MIT or Harvard, was a little difficult to believe but MEPHI, a single subject research institute although an excellent one by all accounts, was absurd. It turned out that MEPHi, because it taught only a single narrow subject, should not have been there in the first place and it was duly removed in 2013. Its presence in 2012 seemed to have been due to two reviews of particle physics, each with over a thousand citations and over a hundred contributors. MEPHi was credited with all those citations, just like all the other contributing institutions, as though it was the sole affiliation of the authors of the reviews. For most of the other universities involved with the reviews, this did not matter very much because they were producing thousands of papers and tens of thousands of citations. MEPHI in contrast was not producing very many papers so those thousands of citations made a big difference.

Over the next few years, there were more incongruous entries in the THE world rankings with institutions getting scores for citations that were far ahead of their overall scores or those for the research indicators. These included Tokyo Metropolitan University, Royal Holloway University of London, Florida Institute of Technology, St George's University of London, King Mongkut's University of Technology, Thonburi, Scuala Normale Superiore di Pisa, and three universities in Istanbul: Boğaziçi University, Istanbul University and Sabançi University (Holmes, 2012).

Evidently the indicator still had several problems. One was that it failed to use fractional counting of citations, that is dividing all the citations by the number of contributing institutions, a procedure used without difficulty by the CWTS Leiden Ranking. As a result, an institution that had made a contribution, no matter how slight, to a publication with scores, or even hundreds, of "authors" and had received hundreds or thousands of citations would receive a huge and incongruous boost providing that its total number of publications remained low. Such multi-contributor publications were most common in particle physics and included the biennial Review of Particle Physics and papers derived from the Large Hadron Collider project. They could also be found in medicine and genetics.

Next, TR continued to count self-citations, something that QS, to its credit, had stopped doing in 2011. The most obvious example of selfcitation was the aggressive self-promotion of El Naschie in the pages of Chaos, Solitons and Fractals and the Journal of Nonlinear Sciences and Numerical Simulation. That became less of a threat after the tweaking in 2011 but there could be no guarantee that self-citation might not give an undue advantage to less than scrupulous research teams in subsequent years.

Another problem, which few experts discussed until 2014, is the "regional modification", the division of the final score of a university for the citation indication by the square root of the score for the country where the university is located. Two universities might start out with identical scores for citations but if one was located in a high scoring country and one in a low scoring country they would end up with very different scores.

The justification for the regional modification was hard to follow. Simon Pratt of TR is reported to have said that "there are significant contrasts in citations behaviour and patterns in different geographic regions. It is argued that not all of these are indicative of underlying research impact. For example, universities in the US are part of a very large research community...which may lead to higher innate citation rates than their peers in developing countries..." (as cited in Baty, 2011b, para.13) and that a "modification to normalise citations by region can help spotlight exceptional institutions in typically low-citing countries. Such a change can also result in a more diverse rankings table that highlights excellence in developing countries" (Baty 2011b, para. 13). It was also claimed that some countries did not provide adequate research funding or encourage networking and that their universities needed a boost to compensate. This is in fact only partly true. Many universities in the Gulf are extremely generous with funding and sponsorship for overseas conferences and so on while there is quite a lot of money around in some Southeast Asian countries although it does not always reach the most qualified researchers.

The result of all of the above was that many universities in South America, Eastern and Mediterranean Europe, and South and East Asia received scores for citations that were out of proportion to other scores especially the research cluster. Why THE should take such a risk with their credibility is not clear but it is possible that it was a financially rewarding proposition for TR to save costs by using procedures identical to their lucrative InCites staff evaluation system.

PUBLIC PERCEPTIONS AFTER 2010

Despite these difficulties, it seems that by 2014 THE had recovered from the disappointing reception of 2010. As early as 2011, the publication received two awards from the Professional Publishers Association for Business Media Brand of the Year and Weekly Business Magazine of the Year (Professional Publishers Association, 2011). Then, in 2012, a report from the steering group of the British Academy (Foley & Goldstein, 2012) reviewed the THE world rankings but not those published by QS or the Shanghai Center for World-Class Universities.

By 2011, after the second edition of the new rankings, Ferdinand von Prondzynski, then head of Robert Gordon University in Scotland, could say that the THE rankings "over recent years have been accepted as the most authoritative international league table" (von Prondzynski, 2011, para.1) although that could imply that they had also been such during the THE-QS period. By 2012, he was reported as saying that they were "increasingly seen as the gold standard" (as cited in Baty, 2012, para. 14).

Meanwhile, Dirk Van Damme became more positive than he had been in 2010 and enthused that the "THE World University Rankings invite us to look beyond the top of the list. They provide a unique opportunity to witness the dynamics in the sub-top league of aspiring institutions, the global expansion and dispersion of the system, and the varying capacities of national systems to succeed in the global war for academic excellence" (Van Damme, 2012, para. 19).

Further endorsements followed. In 2013, Shashi Tharoor, Indian Minister of State for Human Resources Development, asserted that the THE rankings were the "principal yardstick we should look to" (as cited in Baty, 2013, para 13) and a year later when the Economist was reviewing the quality of Chinese universities it saw fit to mention only performance in the THE rankings and ARWU ("A matter of honor", 2014).

In 2014, an official Norwegian report was very critical of global university rankings for several reasons. It analyzed three rankings, the Shanghai ARWU, the Leiden ranking and the THE World University Rankings but not the QS rankings. (Piro, Hovdhaugen, Elken, Sivertsen, Benner & Stensaker, 2014).

In Saudi Arabia, the Custodian of the Two Holy Mosques offers scholarships at 200 universities from the big four brand names, QS, THE, ARWU and the new Best Global Universities produced by the US News ("Scholarship students to study at the world's best universities", 2014). Similarly, the same four rankings had been mentioned earlier for a Hong Kong government scholarship program (Education Bureau, 2014).

It seems that when the media or government bodies wish to be inclusive, they refer to the big three or, now, the big four, including the

US News Best Global Universities, rankings. Should they need to be parsimonious and refer only to two then those two will usually be the THE and the Shanghai rankings. When only one is referred to, that is very often THE. Thus, in 2014 the Asahi Shimbun referred to the position of Japanese universities in the THE rankings but no other (Takahami, 2014) as did the Wall Street Journal in 2015 (Obe, 2015).

The most notable endorsement was from the President of Peking University, Zhu Shanlu, who described Phil Baty as the "education secretary for the world", a phrase repeated in a presentation sent to a seminar in Moscow in April 2015 and at other events (Siwinski, 2015, para. 1).

The supposed virtues of the new THE rankings were even used to denigrate the U-Multirank rating system, which met with considerable hostility from the British higher education establishment and a few leading research universities on the European continent. The European Union committee of the House of Lords reported that THE "told us that their approach seeks to achieve more objectivity by capturing the full range of a global university's activities – research, teaching, knowledge transfer and internationalization – and allows users to rank institutions (including 178 in Europe) against five separate criteria: teaching (the learning environment rather than quality); international outlook (staff, students and research); industry income (innovation); research (volume income and reputation); and citations (research influence)" (House of Lords European Union Committee 2013, para. 55).

So, by 2014 the THE rankings had apparently won the favour of the higher education administrative elite of the United Kingdom and a swathe of research orientated universities in continental Europe. Also, it appeared that many universities in Latin America, Africa, and the Middle East were attracted by the presentation of the THE rankings as prestigious and by participation at exclusive summits. It is not impossible that many universities with middling reputations were aware that one or two contributors to a multi-contributor publication with a huge number of citations could lead to a high overall score.

There were signs that some informed observers were becoming disillusioned. Perhaps the most significant of these was Simon Marginson

of the University College London Institute of Education who said in 2013 that the THE rankings were fatally flawed outside the top fifty although they were still better than the QS rankings (Hare, 2013). Even so, the world rankings and their regional and specialized spin-offs have continued to have a generally respectful reception from administrators and the media.

THE END OF THE THE-TR PARTNERSHIP 2010

At the end of 2014, THE announced that it was ending its partnership with TR and would use data derived from Scopus. It became clear that THE intended to exert greater control over the data and was essentially trying to move upstream and monetize the data collection and distribution process (Baty, 2015).

THE claimed that this would inaugurate a new era of openness and accountability. One sign of this was that when the results of its new academic reputation survey became available, THE was now able to provide a country by country breakdown of the respondents to the survey. This was a small step but one that might be the harbinger of more significant changes.

In early 2015, THE indicated that it was aware of the distorting effects of multi – author publications and indicated that it was considering two possible ways of getting around this, simply deleting these with more than a certain number of authors or using fractional counting. In July, THE published an experimental ranking indicator for 30 African universities that was nothing more than field normalized citation per paper. This time, however, there was a difference. THE, now managing the data collection and processing by itself, had used fractional counting. There were a few cases of universities that had been in both the African rankings and the previous year's world rankings. It was interesting that Université Cadi Ayyad Marrakech's citations score was noticeably reduced (Bothwell, 2015).

However, when the world rankings were published THE simply resorted to removing 649 papers with more than a thousand authors, although it seemed that they were considering introducing fractional counting of citations in later editions of the world rankings. In addition, THE announced that they would divide the citations scores in two, half of them with the regional modification and half without.

The 2015 rankings saw some unprecedented changes. Some universities, such as Twente, Moscow State and University College Dublin did much better than in 2014. At the top end, Oxford and Cambridge rose to overtake Harvard, a shift that appeared to have little to do with Oxford or Cambridge but reflected a large and unexplained fall in Harvard's score for Teaching.

In contrast, there were some dramatic falls in the scores and places of French, Japanese and Korean institutions. Several Turkish universities suffered calamitous tumbles of hundreds of places, because of the withdrawal of the advantages accruing from participation in the Large Hadron Collider project and from the full regional modification (Times Higher Education, 2015).

CONCLUSION

At the end of 2015, it was still not clear whether THE would proceed with further changes. Nor is it certain whether it can maintain its popularity with the world's leading research universities. There is a clear dilemma here. THE could make further changes, especially to the citations indicator, but that would call into question their reputation for reliability and consistency. But if they do not make changes, it is likely that will be more and more anomalous results. This problem is not confined to THE: QS and ARWU have also been forced to confront such problems over the last two years.

Whatever happens, it is likely that the story of the THE rankings will continue to be an interesting one and that the attempt to create global university rankings that are accurate, reliable and valid has yet to succeed.

1. Note

In this paper, 'THES-QS World University Rankings' and 'THE-QS World University Rankings' refer to the rankings published between 2004

and 2009 by the newspaper *Times Higher Education Supplement* (THES), which became the magazine *Times Higher Education* (THE) in 2008, with data collected by QS Quacquarelli Symonds (QS).

'QS World University Rankings' refers to the rankings published in 2010 and after by QS using the methodology that had been developed for the THES-QS/THE-QS rankings and with data supplied by Scopus.

'THE World University Rankings' refers to the rankings published by Times Higher Education (THE) from 2010 with data provided by Thomson Reuters (TR) from 2010 to 2014 when THE announced that it would process and analyze data collected from Scopus.

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STRESS MANAGEMENT COPING STRATEGIES OF ACADEMIC LEADERS IN AN INSTITUTION OF HIGHER LEARNING IN MALAYSIA

Gurnam Kaur Sidhu^{1*} Nor Sa'adah Aziz²

Faculty of Education, Universiti Teknologi MARA, *E-mail:* ¹*gurnamsidhu@salam.uitm.edu.my ² norsaadah_aziz@yahoo.com *Corresponding Author

ABSTRACT

In today's demanding academic environment, academic leaders need to be well equipped with stress management coping strategies as they often find themselves in challenging situations and responsibilities. Therefore, the main aim of this paper is to investigate the stress management coping strategies used by academic leaders in an institution of higher learning located in Selangor, Malaysia. A mixed-methods research design was employed and the sample population involved 46 academic leaders from a public university. Data were collected using a questionnaire and semistructured interviews. The quantitative data were statistically analyzed using SPSS while the qualitative data were analyzed thematically. The findings showed that a majority of the academic leaders opted towards positive problem-focused engagement strategies such as cognitive restructuring and problem solving strategies followed by emotion-focused engagement which included expressing emotion and social support strategies. Besides that, academic leaders did confess that they sometimes do use disengagement strategies such as wishful thinking, problem avoidance and self-criticism coping strategies but they stressed that they faced problems and stress in a positive and constructive manner. The findings of this study imply that academic leaders in this study are engaged and well informed of stress coping strategies. However, it is recommended

that top management in institutions of higher learning take the initiatives in providing necessary support to academic leaders by educating them on stress management coping strategies.

Keywords: academic leader, coping strategy, stress management.

INTRODUCTION

Academic leaders in Institutions of Higher Learning (IHL, hereafter) play an important role as they are responsible to help lead the university towards excellence. Anderson (2009) stressed that the assumption that the teaching profession focused mainly on teaching is very much outdated as the roles and responsibilities of a lecturer have evolved. Nowadays, lecturers are not only considered as educators, but also academic leaders, curriculum developers, coaches and mentors to both colleagues and students alike. Murphy and Curtis (2013) defined an academic leader as an individual who leads and manages change, builds consensus and promotes collaboration, encourages faculty development in the campus, sets academic priorities, champions the programs and then evaluates faculty effectively and fairly. Milburn (2010) further elaborates that academic leaders usually hold various administrative positions in addition to their teaching responsibilities. Deans, deputy deans, programme coordinators and lecturers are considered as important individuals in the university as they are committed to handle demanding responsibilities as academic leaders (Asmahwati et al., 2014).

Likewise, Millburn (2010) also highlights that academic leaders play an important role in their respective department as they need to perform multiple roles in managing and maintaining the learning environment. In addition, drawing on literature from countries such as the USA and the United Kingdom, it is being suggested that there are a number of distinctive features required of leaders in institutions of higher learning in order to ensure staff preservation, autonomy and a spirit of collegiality (Bryman, 2007). Today's leaders need to develop and generate new knowledge, abilities and skills to effectively cope with constant organizational changes. Afnan Al-Shuaiby (2009) further reiterates that one of the most significant functions of IHLs in their reliance on leadership effectiveness
in creating a pleasant teaching environment for faculty and in providing students with quality education. Moreover, Blair (2000) stated that IHLs are increasingly expecting an academic leader to accomplish external funding to be considered as an effective leader.

These roles of academic leaders are also articulated by Asmahwati et al. (2014) who noted that such demanding tasks have forced academic leaders to face stress from their job responsibilities. Murphy and Curtis (2013) further reiterated that academic leaders are often exposed to strong and negative emotions such as stress, anger, anxiety and also frustrations due to their excessive workload. Murphy and Curtis (2013) summarised all the challenges faced by academic leaders into four categories which are: bureaucratic burden, status and demand of leadership, the management of others and role confusion. Bryman (2007) further highlights that bureaucracy as a system of government or business often has many complicated rules and procedures which require academic leaders to balance educational, managerial and political leadership responsibilities. To this, Schermerhorn et al. (2000) added that as academic leaders, role overload in higher education often occurs and one is often expected to do more beyond the call of duty leaving a lecturer often overwhelmed with work. Dyer and Miller (1999) state that academic leaders must cope with the different responsibilities that come with the different major roles. Academic leaders not only need to participate in key decision making meetings but also supervise the daily process of staff, both clerical and professional.

A study conducted by Campbell, Baltes, Martin and Meddings (2007) revealed that 88 percent of leaders often claim that work is a primary source of stress in their lives and more than two-thirds of them believe their stress level is higher today than it was five years ago. Besides that, 60 percent of them emphasised that their organizations failed to provide them with the necessary tools and strategies to effectively manage stress. They also pointed out that their stress was often caused by task demands such as job responsibilities and decision making. The same study further revealed that a lack of resources and time are the most stressful leadership demands experienced by leaders. For a majority, stress is caused by leaders trying to do more with less, and to do it faster. More importantly, close to 80 percent felt that their organisations failed to provide adequate support for stress management and felt they could benefit from a stress management coach.

Another survey led by Groove (2012) highlighted that academic leaders are suffering from growing stress levels as a result of heavy workload. He further elaborates that academic leaders today need to deal with unachievable deadlines, acute time pressures and the need to work quickly. In addition, Brown and Uehara (2008) further added that the daily interactions with students, co-workers and the never-ending fragmented demands of teaching often lead to overwhelming pressure which directly causes stress among academic leaders. Therefore, it is pertinent that academic leaders learn to cope with stress. There are studies that have explored and have looked at students' perspectives of perceived stress and the use of coping strategies (Julismah & Ikmalhisham, 2005; Kausar, 2010). However, there is scant empirical evidence of such studies conducted in Asia especially among academic leaders in IHLs in Malaysia. Therefore, this study aimed to investigate the stress management coping strategies used by academic leaders in a public university located in Shah Alam, Malaysia.

LITERATURE REVIEW

According to Morris and Miller (2008), the shared governance policies of most universities assign academic decisions such as student admissions criteria, faculty hiring and endorsement, curriculum growth and awarding degrees to academic leaders at the faculty level. They further specified that the faculty typically expects the university president to focus on political relations, fund-raising, and protecting their academic programs and they usually allow academic leaders to look into academic issues on their own. Besides that, academic leaders also need to be able to identify problems and resolve them in a timely manner whilst adapting their leadership style accordingly. Setting department goals and making satisfactory progress in motivating the staff to meet the established goals is also another important skill. Thus, in order to meet the objectives, academic leaders must search and discover the best method in motivating their faculty members. They should also be active in their profession and have respect for their professional colleagues. To handle all these roles and responsibilities, Morris and Miller (2008) also highlight that academic leaders need to possess psychological characteristics which include aptitude, physical stamina, maturity, judgment, attitude, reliability, and dependability. More

importantly, they need to be well equipped with stress and burnout coping strategies.

According to Mostert and Joubert (2005), coping is a central theme often discussed in stress and burnout research and studies have focused on individuals coping responses to different sources of stress. Generally, coping strategies refer to how people try to cope with stress and manage it effectively. Lazarus (1999) points out that coping represents an individual's cognitive, affective and behavioural effects to manage specific external and internal demands. Folkman and Lazarus (1985, p. 5) further elaborate coping responses as "cognitions (thoughts) and behaviours that a person uses to reduce stress and to moderate its emotional impact". They further indicate that whether it is a dispositional or situation-specific response, coping behaviors are divided into two basic frameworks, i.e. problem and emotion-focused coping dimensions. According to Latack and Havlovic (1992) these two coping dimensions differ in the way coping behaviour is targeted where the problem focused coping dimension is aimed at solving the problem whilst emotion focused coping dimension is directed towards regulating the emotion of the person under stress. According to researchers (Edwards & Olden, 2003; Rothmann & Van Rensburg, 2002), problemfocused types of coping strategies are directed at the problem and look for ways to manage and solve the problem, meanwhile emotion-focused coping strategies involve reducing the effects of stressful feelings caused by unpleasant experiences through relaxation, the use of substances, social activities or defence mechanism, and also avoidance.

Problem-focused coping strategies are similar to problem-solving tactics. These strategies encompass efforts to define the problem, generate alternative solutions, weigh the costs and benefits of various actions, take actions to change what is changeable, and if necessary, learn new skills. Problem-focused efforts can be directed outward to alter some aspect of their self. Many of the efforts directed at self fall into the category of reappraisal for example, changing the meaning of the situation or event, reducing ego involvement, or recognizing the existence of personal resources or strengths. Meanwhile, emotion-focused coping strategies are directed toward decreasing emotional distress (Lazarus & Folkman, 1984). These tactics include such efforts as distancing, avoiding, selective attention and blaming, minimizing, wishful thinking, venting emotions,

seeking social support, exercising and mediating. Tobin (2001, p.3) in his Manual Coping Strategies Inventory identifies four main coping strategies often used in managing stress. Given below are the specific coping strategies people use in response to stressful events:

- 1. **Problem Focused Engagement** is a coping strategy which includes both the Problem Solving and the Cognitive Restructuring subscales. These subscales involve cognitive and behavioral strategies to change the situation or to change the meaning of the situation for the individual. These coping efforts are focused on the stressful situation itself. These strategies attempt to alleviate or eliminate stressful situations through taking control and weighing up the negative and also positive impacts.
- 2. **Emotion Focused Engagement** refers to coping skills that aim to reduce and manage the intensity of negative and distressing emotions that a stressful situation has caused rather than solve the problematic situation itself. It includes the subscales Social Support and Express Emotions. The items reflect open communication of feelings to others and increased social involvement, especially with family and friends. These coping efforts are focused on an individual's emotional reaction to the stressful situation.
- 3. **Problem Focused Disengagement** is a coping strategy that exercises restraint. This subscale includes both Problem Avoidance and Wishful Thinking. The items reflect denial, avoidance, and an inability or reluctance to look at a situation differently. They reflect cognitive and behavioral strategies to avoid the situation. Even though restraint is often overlooked as a potential coping strategy, it is sometimes seen as a functional response to stress.
- 4. **Emotion Focused Disengagement** includes the subscales of Social Withdrawal and Self Criticism. The subscale involves shutting oneself and one's feelings off from others, and criticizing or blaming oneself for what happens.

A study conducted by Dewi (2011) indicated that experienced system management workers who use a balance of problem-focused coping strategy and emotion-focused coping strategies are most successful in dealing with the stress of staying perpetually up-to-date. She further elaborated that experienced employees who deploy different combinations of coping strategies end up with different levels of distress but a majority often opt towards problem-focused coping and emotion-focused coping strategies. The most effective strategy is problem solving if the individual has a realistic chance of changing the stressor or the aspect that lead to the stressor. Research has shown that problem-focused coping is typically used in situations that are perceived to be controllable for example work issues (Folkman & Lazarus, 1985). In contrast, emotion-based coping is usually used in situations where the stressors are less controllable. Conversely, emotion-based coping is usually used in situations where the stressors are less controllable for example, terrorist attacks.

Fawzy et al. (1990) indicate that emotional focused coping strategies are often utilized when the problem is out of a person's control and in situations where a person has a terminal illness or sudden health problems and the person needs to cope and try to accept the situation. In addition, Folkman and Moskowitz (2004) further add that that the use of such coping strategies may reduce depression and hostility while increasing life satisfaction. Galor (2012) indicates that emotion focused coping increases the sense of pleasure, positivity and contentment in human lives and thus enables people to increase their ability to focus on that which can be changed. He further identified the following as examples of behavioural emotional focused coping strategies: listening to music, massage, meditation, physical exercise, spending time with friends, keeping a diary or journal, taking a hot bath, expressing emotions creatively for instance by painting and having a sense of humour. Zeidner and Zammer (1992) report that spiritual factor too can help cope with stress as it provides meaning and a larger context in which the situation can be understood.

Galor (2012) elaborates that seeking social support for emotional reasons such as getting moral support, sympathy, or understanding as an aspect of emotion-focused coping strategies. Snow et al. (2003) further notes that social support is a significant feature of an individual's social environment and varying levels of support will be perceived as available

to the individual in times of need. They further indicate that recent attention has turned to examining the role of social support in managing the stressful situation. For instance, problem-solving coping strategies on the part of the individual and instrumental support from others are both aimed at modifying or managing the stressful situation. In addition, social support may operate in the stress process to reduce the perceptions or experience of work stressors and therefore indirectly reduce the likelihood of negative outcomes such as psychological symptoms. Just as active coping may serve to mediate the effects of social support coping strategy, work stressors may also operate as another mediating pathway. Support for this hypothesis is found in several cross-sectional studies in which greater perceived social support was related to lower levels of reported work stressors (Griffith et al., 1999; Jayaratne, Himle & Chess, 1988; Kumari & Sharma, 1990; Pompe & Heus, 1993).

On the other hand, there are situations where people disengage themselves from stressful situations. For instance, the exercise of restraint is sometimes used as a problem focused coping strategy. Even though restraint is often overlooked as a potential coping strategy, it is sometimes needed and is a functional response to stress. According to Dewi (2011), restraint coping is waiting until an appropriate opportunity to act presents itself, holding one-self back, and not acting prematurely. It can be viewed as an active coping strategy in the sense that the person's behaviour is focused on dealing effectively with the stressor, but it is also a passive strategy in the sense that using restraint means not acting. According to Myers (1995), self-criticism is another frequent stress coping strategy used among people who report a high level of stress. Zuroff et al. (2005) highlighted that research in both clinical and non-clinical samples has shown that in the face of stressful life events, the maladaptive traits of selfcriticism and dependency are related with raised depressive symptoms and augmented threat for an episode of depression.

Through the effective use of coping strategy, the negative influence of stress on health and performance can be reduced. For instance, the use of coping strategies allows a person to successfully manage the stressful situation. When there is a poor fit between a person's stress levels and his or her coping capacity, adjustment strategies are likely to be ineffective and negative health outcomes can occur; thus, leading to poor performance

later on. Conversely, when appropriate coping resources are available, a person is likely to manage stress effectively. With the ever changing academic scenario of today, this study aimed to investigate the stress management coping strategies used by academic leaders at an institution of higher learning in Malaysia.

METHODOLOGY

This study was descriptive in nature and involved a sample population of 46 academic leaders which consisted of deans, deputy deans, program coordinators and lecturers from an institution of higher learning located in Malaysia. The IHL is one of the largest universities in Malaysia. This study involved academic leaders from three randomly selected branch campuses of the university which is located in Shah Alam in the state of Selangor in Malaysia. The data were collected using a questionnaire and semi-structured interviews. The questionnaire for this study was adapted from the Manual Coping Strategy Inventory (Tobin, 2001).

The questionnaire was divided into three (3) parts. Part A explored the demographic profile of the respondents while Part B consisted of 72 items on coping strategies used while Part C comprised open-ended questions which investigated the challenges and stressful situations faced by academic leaders and strategies they employed to reduce their stress. The questionnaire was piloted and below is the results of the Cronbach's alpha reliability test. The reliability index of the questionnaire are seen in Tables 1 and 2.

Component	Alpha
Problem Solving (n=15)	.72
Cognitive Restructuring (n=15)	.73
Express Emotions (n=15)	.69
Social Support (n=15)	.69
Problem Avoidance (n=15)	.62
Wishful Thinking (n=15)	.68
Self-Criticism (n= 15)	.71
Social Withdrawal (n=15)	.84

Table 1: Reliability Analysis for Coping Strategy Inventory Based on Each Strategy

Table 2: Reliability Analysis for Coping Strategies in General

Component	Alpha
Overall Coping Strategy	0.713

The quantitative data were statistically analyzed using SPSS version 20. Thematic analysis was used to analyse the qualitative data to trace emerging themes pertaining to the variables in the study. To triangulate the findings, interviews were conducted with six academic leaders. Respondents were coded for easy reference. For example, in Campus A, the respondents were given pseudonyms which began with the alphabet "A" – i.e. A1, and A2 while respondents from campus B, were referred to as B1 and B2. Likewise, respondents from campus C were given pseudonyms beginning with the alphabet "C" and they were C1 and C2.

RESULTS AND DISCUSSION

Data from the demographic profile revealed that from the 46 respondents, 52.2% were female academic leaders whilst 47.8% of the respondents were males. A majority (52.2%) of the respondents held the position of program coordinator, while 37% of them were lecturers and the remaining (10.8%) were deans. In addition, a majority of the respondents (76.1%) had more than five years of working experience and this indicated they were experienced academic leaders. Meanwhile 23.9% of the respondents had less than five years of working experience and in this study, they were considered as novice academic leaders.

Most Frequently Used Coping Strategies among Academic Leaders

From the results displayed in Table 3, it can be seen that that the respondents in this study were rather engaged in using positive stress management coping strategies The results show that the most frequently used stress management coping strategies among the respondents was problem focused engagement (M=3.84, SD= 0.504) strategies followed by emotion focused engagement (M= 3.46, SD= 0.547) strategies. Tobin (2001) posits that through problem-focused strategies (Problem Solving, Cognitive Restructuring) and emotion-focused strategies (social support

and express emotions), a person is able to employ a dynamic and enduring negotiation by means of the stressful and tense events / surroundings. This further indicates that academic leaders in this IHL are able to manage their stress wisely and accordingly.

Within the problem focused engagement strategies, the respondents most frequently employed cognitive restructuring (M=3.89, SD= 0.497) and problem solving strategies (M=3.78, SD= 0.531). This was followed by emotion focused engagement strategies such as social support ((M= 3.54, SD= 0.671) and express emotions (M= 3.38, SD= 0.562) strategies.

 Table 3: Most Frequently Used Stress Management Coping Strategies among Academic Leaders (n=46)

No.	Primary Factors	Mean	SD
1	Cognitive Restructuring	3.89	0.497
2	Problem Solving	3.78	0.531
3	Social Support	3.54	0.671
4	Express Emotions	3.38	0.562
5	Wishful Thinking	2.74	0.477
6	Problem Avoidance	2.58	0.381
7	Self-Criticism	2.46	0.508
8	Social Withdrawal	2.33	0.521
No.	Secondary Factors	Mean	SD
No. 1	Secondary Factors Problem Focused Engagement	Mean 3.84	SD 0.504
No. 1 2	Secondary Factors Problem Focused Engagement Emotion Focused Engagement	Mean 3.84 3.46	SD 0.504 0.547
No. 1 2 3	Secondary Factors Problem Focused Engagement Emotion Focused Engagement Problem Focused Disengagement	Mean 3.84 3.46 2.66	SD 0.504 0.547 0.395
No. 1 2 3 4	Secondary Factors Problem Focused Engagement Emotion Focused Engagement Problem Focused Disengagement Emotion Focused Disengagement	Mean 3.84 3.46 2.66 2.39	SD 0.504 0.547 0.395 0.472
No. 1 2 3 4 No.	Secondary Factors Problem Focused Engagement Emotion Focused Engagement Problem Focused Disengagement Emotion Focused Disengagement Tertiary Factors	Mean 3.84 3.46 2.66 2.39 Mean	SD 0.504 0.547 0.395 0.472 SD
No. 1 2 3 4 No. 1	Secondary Factors Problem Focused Engagement Emotion Focused Engagement Problem Focused Disengagement Emotion Focused Disengagement Tertiary Factors Engagement	Mean 3.84 3.46 2.66 2.39 Mean 3.65	SD 0.504 0.547 0.395 0.472 SD 0.469

(Scale: 1= Not at all, 2= A little, 3= Somewhat, 4= Much, 5= Very Much)

Similar results were also observed in a study conducted by Lazarus and Folkman (1984) where the most preferred stress management coping styles used were also problem-focused and emotion-focused coping strategies. They further added that problem-focused coping strategies involved seeking information and solving the problem whilst emotionfocused coping strategies deal with expressing and regulating emotions.

From the quantitative findings presented in Table 4, it can be seen that the respondents displayed positive stress coping constructive strategies. They acknowledged that they often tried to look at the bright side of things (M=4.09, SD=0.661) and try to make the best of what was available (M=4.07, SD= 0.772). When faced with a problem, they would try to get a new angle on the situation (M=3.96, SD=0.698), tell themselves things that help them feel better (M=3.93, SD= 0.712) and often convince themselves positively that things are reflective of the fact that the academic leaders in this IHL are engaged in a dynamic and enduring negotiation and are proficient to handle stressful settings.

Correspondingly, similar findings were also reflected in the interview sessions. A majority of the respondents interviewed admitted that as academic leaders, their jobs were rather stressful and having to solve problems and address issues were part and parcel of their everyday work. Therefore, they felt they had developed stress management and problem solving strategies. For instance, Respondent A2, a male academic leader stressed that:

Whenever I have a problem or am stressed out, I look at it positively and try to look at the problem from a new perspective . . . in my opinion, there is no problem that cannot be solved. . . I sometimes step back and relook or reorganize the situation or problem and sometimes I get a new perspective of things.

Table 4: Cognitive Restructuring Strategies Employed by Academic Leaders

Item No	Cognitive Restructuring Items	Mean	SD
10	I look for the silver lining, so to speak; try to look on the bright side of things.	4.09	0.661
26	I look at things in a different light and try to make the best of what is available.	4.07	0.772
50	I step back from the situation and put things into perspective.	4.00	0.730
2	I try to get a new angle of a situation.	3.96	0.698
18	I tell myself things that help me feel better.	3.93	0.712
58	I reorganize the way I look at a situation, so things do not look so bad.	3.85	0.698
34	I ask myself what is really important, and discover that things are not so bad after all.	3.80	0.687
42	I convince myself that things are not quite as bad as they seem.	3.76	0.673
66	I go over the problem again and again in my mind and finally see things in a different light.	3.59	0.717

(Scale: 1= Not at all, 2= A little, 3= somewhat, 4= Much, 5= Very Much)

Rather congruent thoughts were also articulated by an experienced female respondent (Respondent B2) who stressed that:

My job as a programme coordinator is rather stressful but over the years I have learnt to cope well. I see problems and stress as part of my life . . .when I am stressed I usually try to see the problem in a new light and tell myself that I have the confidence to solve it . . .sometimes I do let the problem or issue rest for a day or two so that I can address it when my mind is clearer.

Both of these excerpts above show that academic leaders employ cognitive restructuring problem-solving strategies to cope with stress. When they are stressed, they would approach it in a positive manner and try to explore the problem or stress. This was well articulated by Tull (2012) when he highlighted that cognitive behavioural coping strategies have been found to be effective for a wide range of symptoms that many people in stressful situations may experience. Tull (2012, p.7) further elaborated that cognitive restructuring is a common cognitive-behavioural coping strategy as it helps us

... to evaluate and think about ourselves, other people, and events can have major impacts on our mood. Cognitive restructuring focuses on identifying negative thoughts or evaluations and modifying them; this may be done by gathering evidence for and against certain thoughts. By modifying our thoughts, we may be able to improve our mood and make better choices with regards to behaviours.

Besides problem-focused engagement, the respondents also indicated favorable responses to emotion-focused engagement strategies such as social support (M=3.61) and expressing emotions (M= 3.45). Further analysis presented in Table 5 reveal those respondents when facing stressful situations would employ social support coping strategies. They would take time to talk to someone who is in a similar situation (M=3.72, SD= 0.911) or accept sympathy and understanding from someone (M=3.59, SD= 0.777). A majority also felt it would help if they talk to someone close to them (M=3.54, SD= 0.808) or find somebody who is a good listener (M=3.33, SD= 0.896).

3.35

3.33

0.924

0.896

Table 5. Social Support Strategies Employed by Academic Leaders				
Items	Social Support Items	Mean	SD	
68	I talk to someone who is in a similar situation.	3.72	0.911	
28	I just spend more time with people I like.	3.67	0.944	
4	I accept sympathy and understanding from someone.	3.59	0.777	
60	I spend some time with friends.	3.59	0.979	
52	I ask a friend or relative I respect for advice.	3.57	0.910	
20	I talk to someone about how I am feeling.	3.54	0.887	
36	I talk to someone that I am very close to.	3.54	0.808	

Table 5:	Social	Support	Strategies	Employed by	v Academic Leaders	
	OCCIUI	CUDDOIL	Ollaconco			

(Scale: 1= Not at all, 2= A little, 3= Somewhat, 4= Much, 5= Very Much)

I find somebody who is a good listener.

I let my friends help out.

44

12

Table 6: Express	Emotions Str	rategies E	Employed b	y Academic	Leaders
		J		,	

Items	Express Emotions Items	Mean	SD
3	I find ways to blow off steam.	3.91	0.812
11	I do some things to get it out of my system.	3.61	0.714
27	I let out my feelings to reduce the stress.	3.50	0.983
59	I get in touch with my feelings and just let them go.	3.35	0.900
19	I let my emotions go.	3.48	0.836
35	I let my feelings out somehow.	3.41	0.748
43	I let my emotions out.	3.28	0.911
67	I am angry and really blow up.	3.00	0.989
51	My feelings are overwhelming and they just explode.	2.87	0.885

(Scale: 1= Not at all, 2= A little, 3= Somewhat, 4= Much, 5= Very Much)

These views were also reflected in interviews where respondents agreed that sometimes they do "talk to their colleagues or friends" or "look for a friend to discuss the problem or issue" (Respondent B1). Furthermore, there were also instances when they would "find ways to get rid of the problem" or "discuss with my superior to help me out" (Respondent C1). During the interview session, Respondent B2 highlighted that when she is stressed she often listens to music, go for a massage or do yoga. According to Galor (2012), behavioural emotional focused coping strategies include the following: listening to music, massage, meditation, physical exercise, spending time with a friend, keeping a diary or a journal, taking a hot bath, and expressing the emotions creatively for instance by painting or having a sense of humour.

Respondents also emphasised that they do employ engaging emotion strategies (Table 6) such as going and finding ways to blow off steam (M=3.91, SD= 0.812) or do some things to get stress out of their system (M=3.61, SD= 0.714). Sometimes, they would let out their feelings to reduce the stress (M=3.50, SD= 0.983) or let their emotions go (M=3.48, SD= 0.836). Nevertheless, they admitted that they do not allow their feelings to overwhelm them (M=2.87, SD= 0.885).

Even though results in this study revealed that a majority of the respondents agreed that they applied positive engaging stress coping strategies, data also showed that at times they did apply disengagement strategies (M=2.53, SD 0.402). Results in Table 3 display that they did employ problem-focused disengagement (M=2.66, SD=0.395) and emotion-focused disengagement (M=2.39, SD=0.472) strategies. These respondents did sometimes apply problem-focused disengagement strategies such as wishful thinking (M=2.74, SD=0.477) and problem avoidance strategies (M=2.58, SD=0.381). According to Tolbin (2001), these stress coping strategies refer to "cognitive strategies that reflect an inability or reluctance to reframe or symbolically alter the situation is interrelated with the hope and wish so that the problem would be better" (p.3). Nevertheless, respondents display very little employment of emotionfocused disengagement coping strategies such as self-criticism (M=2.46, SD=0.508) and social withdrawal (M=2.33, SD=0.521) strategies. Such coping strategies show that a person is in denial of the problem and avoids the thought or action about the stressful situation or event (Tolbin, 2001). Further details of these disengagement strategies are disclosed in Tables 7 and 8.

Data presented in Table 7 further show respondents' views on the employment of wishful coping strategies. It can be seen that they do often wish that they could have changed what happened (M= 3.48, SD= 0.863). This demonstrates that academic leaders do often reflect on what has happened and wish they could amend it later or hopefully wish that the situation could go away (M= 3.11, SD= 0.795). They also articulated that they hardly ever hope the problem would take care of itself (M=2.00, SD= 0.667) indicating that academic leaders know that problem do not disappear into think air and they try their best to deal with it effectively. This was well articulated by Respondent C2 when she said that,

I know that stress and problems do not disappear overnight, sooner or later we have to deal with the problem . . . so I do look at it positively and give myself time to deal with it.

ltem No	Wishful Thinking Items	Mean	SD
62	I wish I could have changed what happened.	3.48	0.863
30	I wish that the situation would go away or somehow be over with.	3.11	0.795
46	I have fantasies or wishes about how things might turn out.	3.07	0.800
22	I wish that I never let myself get involved with that situation.	2.96	0.918
38	I wish that the situation had never started.	2.72	0.958
70	I think about fantastic or unreal things that make me feel better.	2.70	0.813
14	I hope a miracle will happen.	2.37	0.903
54	I hope that if I wait long enough, things would turn out OK.	2.24	0.788
6	I hope the problem would take care of itself.	2.00	0.667

Table 7: Wishful Thinking Strategies Employed by Academic Leaders

(Scale: 1= Not at all, 2= A little, 3= Somewhat, 4= Much, 5= Very Much)

Findings exhibited in Table 8 show that respondents do at times employ some problem avoidance strategies as they do not allow the problem to get to them and hence refuse to think about it too much (M= 4.43, SD= 0.860) or just refuse to get too serious about it (M=3.20, SD=0.833). This is indicative that academic leaders are not so easily distracted by the problem and sometimes they prefer to avoid it by not thinking about it. Nevertheless, they are not disengaged and do not sleep more than usual (M= 2.15, SD= 0.988) or avoid thinking or doing anything about the situation (M= 2.15, SD= 0.842). The low mean scores also show that academic leaders do not employ problem avoidance coping strategies. They are positively engaged and look for ways to handle their stressful situations.

ltem No	Problem Avoidance Items	Mean	SD
29	I do not let it get to me; I refuse to think about it too much	3.43	0.860
53	I make light of the situation and refuse to get to serious about it.	3.20	0.833
37	I decide that it is really someone else's problem and not mine	2.61	0.714
21	I try to forget the whole thing.	2.48	0.781
13	I go along as if nothing was happening.	2.43	0.720
45	I avoid the person who is causing the trouble.	2.41	0.909
61	Every time I think about it I get upset; so I just stop thinking about it.	2.37	0.951
5	I sleep more than usual.	2.15	0.988
69	I avoid thinking or doing anything about the situation.	2.15	0.842

Table 8: Problem Avoidance Strategies Employed by Academic Leaders

(Scale: 1= Not at all, 2= A little, 3= Somewhat, 4= Much, 5= Very Much)

Other disengagement coping strategies that people sometimes disengage themselves emotionally are by using self-criticism and social withdrawal coping strategies. The results of respondents' use of these strategies are shown in Tables 9 and 10.

The respondents admitted that they sometimes use self-criticism coping strategies and feel they are personally responsible for their difficulties (M=3.93, SD= 0.646) and wish they were not so careless (M=3.04, SD=0.729). Nevertheless, the results show that they are not too critical of themselves and hardly criticise themselves for what happened (M=2.35, SD=0.924) and admit they are not stupid ((M=1.83, SD=0.902). This indicates that the academic leaders can successfully cope with stressful situations as they sometimes feel they are accountable and responsible for what happened. A similar sentiment was also voiced by Respondent B1 during the interview. He explained that

I feel we are all sometimes responsible for the situation we are in ... therefore we have to acknowledge the fact that perhaps we overlooked some details ... but what is important is the fact that we have to admit our mistakes and take the necessary steps to solve the problem.

ltem No	Self-Criticism Items	Mean	SD
47	I realize that I am personally responsible for my difficulties and really lecture myself.	3.93	0.646
7	I tell myself that if I was not so careless, things like this would not happen.	3.04	0.729
39	Since what happened was my fault, I really chewed myself out.	2.65	0.948
15	I realize that I bring the problem on myself.	2.41	0.979
63	It was my mistake and I need to suffer the consequences.	2.37	0.771
31	I criticize myself for what happen.	2.35	0.924
55	I kick myself for letting this happen.	2.04	0.788
23	I blame myself.	2.02	0.830
71	I tell myself how stupid I am.	1.83	0.902

Table 9: Self-Criticism Strategies Employed by Academic Leaders

(Scale: 1= Not at all, 2= A little, 3= Somewhat, 4= Much, 5= Very Much)

Finally, some respondents did confess to the application of the disengagement coping strategy of social withdrawal (Table 10). Respondents conceded that they often do keep to themselves or try to keep their feelings to themselves (M=3.89, SD= 0.729) when facing a stressful situation or problem. Congruent findings were also revealed from interviews. For instance, Respondent A2 maintained that problems are common lifelong problems and he said that:

I do confess that I sometimes keep quiet or try to sweep the problem under the carpet and then there are times I just keep to myself and withdraw from friends because I do not like to share my problems but let me stress that does not happen for too long. . . I know that wishful thinking or avoidance does not make problems disappear . . . so sooner or later, I have to deal with the situation but for a while I do sometimes avoid it.

ltem No	Social Withdrawal Item	MEAN	SD
8	I try to keep my feelings to myself.	3.89	0.729
48	I spend some time by myself.	3.30	0.866
64	I do not let my family and friends know what is going on.	2.43	0.860
56	I keep my thoughts and feelings to myself.	2.37	0.741
72	I do not let others know how I am feeling.	2.28	0.807
16	I spend more time alone.	2.15	0.842
40	I do not talk to other people about the problem.	2.11	0.795
32	I avoid being with people.	1.78	0.786
24	I avoid my family and friends.	1.52	0.623

Table 10: Social Withdrawal Strategies Employed by Academic Leaders

(Scale: 1= Not at all, 2= A little, 3= Somewhat, 4= Much, 5= Very Much)

Yet findings in Table 10 show that a majority hardly withdrew from stressful situations by avoiding others such as family and friends (M= 1.52, SD= 0.623). It indicates that academic leaders stay away from social avoidance strategies when they are stressed.

CONCLUSION

Research in the field of higher education policy and management conducted by researchers such as Morris and Miller (2008), Milburn (2010) and Murphy and Curtis (2013) all reiterate that academic leaders today face many challenges related to their demanding roles and responsibilities. Campbell et al. (2007) note that besides relationship building, leaders also need to deal with conflicts at the workplace, solve problems and make effective decisions. Their jobs also demand developing people and managing limited resources and such task alongside many frequent demands contribute to leaders facing a high level of stress. This stress is further compounded with physical demands such as travel, long work hours and ever changing work environment. Goolsby (1992) proposed that the magnitude and direction of consequences of job stress are partially determined by the ability to effectively apply the right stress management coping strategies. Studies (Goolsby, 1992; Morris & Miller, 2008; Murphy & Curtis, 2013) also indicated that effective academic leaders often employ problem-focused and emotion-focused engagement coping strategies which were identified as the most successful and preferred strategies used to alleviate stress at the workplace.

Likewise, similar findings were also recorded in this study which involved academic leaders from three branch campuses at an institution of higher learning in Malaysia. The findings gathered from both quantitative and qualitative data also revealed that a majority of academic leaders in this study employed positive and constructive problem-focused and emotion-focused coping strategies. They also showed highest preference for cognitive restructuring and problem solving coping strategies followed by constructivesocial and emotion focused strategies. This result is also similar with the study of Burke (2014) where he cited from previous study of Lazarus and Folkman (1984) where the most common typology of coping style includes problem focused and emotion focused coping strategies. Galor (2012) further elaborates that emotion focused coping increases the sense of pleasure, positivity and contentment in human lives and thus enables people to increase their ability to focus on that which can be changed.

Although the respondents in this study admitted to the use of some disengagement strategies such as wishful thinking, problem avoidance and self-criticism coping strategies, they acknowledge the fact that at the end of the day, they faced their problems and stressful situations and tried their best to solve their problems. Overall, the study revealed that academic leaders in this institution of higher learning in Malaysia seek to maintain a positive stance in addressing stress and difficulty at their workplace.

This study has provided some useful insights which may be beneficial to improvement in institutions of higher learning as well as practice, research, and educational policy. Campbell et al. (2007) highlight that in their study on leaders, close to 12 percent of their respondents stressed that no support was offered to employees to help them manage stress. Although the percentage is not overwhelming, it does speak of lost opportunities by organisations to assist their leaders to facilitate better stress management coping strategies. Since academic leaders are continually facing demanding tasks alongside their numerous roles and responsibilities, there is a need for organisational approaches to manage stress. Academic leaders need to equip themselves with stress management coping strategies. Henceforth, the Ministry of Higher Education (MoHE) need to ensure the right training or specific modules are provided to academic leaders so that they can handle their stress accordingly. Besides that, organisations also need to develop support groups that can help one manage stress and stay on track.

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EVALUATION OF EZYSTATS3Q MODEL APP FOR STATISTICAL ANALYSIS LEARNING IN HIGHER EDUCATION

Chan Yuen Fook Suthagar Narasuman Faculty of Education Universiti Teknologi MARA E-mail: yuenfook@salam.uitm.edu.my

ABSTRACT

Statistics may be viewed as an intimidating subject for students in universities and a stumbling block for researchers to complete their research projects. Nevertheless, researchers at Harvard University view statisticians as one of the most promising jobs for the next ten years. Henceforth, statistics should be seen as a chance for a better future. According to Calson, Keith and Winquist (2011), "what students do and how they think about what they did determine whether a given active learning approach will be successful" (p. 3). Therefore, a product referred to as the EzyStat3Q Model which is a hands-on guide developed by the writers of this paper to lead university students and researchers to learn the tricks of statistics quickly through a multi modal approach is evaluated. EzyStat3Q Model is a quick and interactive learning model which comprises MOOCs, Mobile App, Interactive Multimedia PowerPoint, e-Book, and Quick Learning Print Module. This creative statistical learning model is expected to lead university students and researchers to learn the tricks of statistics quickly. This model utilizes the concept of multimodality and built-in quick references to trigger active learning through a constructivist approach among students and lecturers in the learning and teaching of statistics. In order to obtain feedback from users, a descriptive research was conducted with two intact groups of 45 masters students at the Faculty of Education of a public university in Malaysia. The data collected via questionnaires were analysed descriptively to identify mean and standard deviation for each item. Besides that, qualitative data from the interviews with five students were used to support the quantitative data collected from questionnaires.

The findings indicated the EzyStats3Q Model App has acquired certain levels of quality in terms of ease of use, user interface, audience appeal, effectiveness, presentation, program content, and documentation. The paper has identified some important implications and recommendations for the improvement of this product at a higher level.

Keywords: EzyStats3QModel App, statistics, active learning

INTRODUCTION

In an attempt to boost teaching and learning practices, most learning institutions especially higher education institutions have been intensifying the use of Information and Communication Technology (ICT) into the curriculum (Moses, Abu Bakar, Mahmud & Wong, 2011). Instead of traditional teaching whereby an educator becomes the sole controller over the learning process, recent trends in education have identified that students are exposed to the use of ICT such as computers, interactive whiteboard, projectors, and such. Such exposure is deemed to be crucially important in preparing and helping the students to cope with the ever-progressing Information age (MSC, 2005). The creation of a dynamic ICT environment for learning has also triggered rich opportunities for the development of online learning in Malaysia. Online learning process involves the use of a computer and the assistance of the Internet technology with the main aim of enhancing students' learning experiences and performances (Al-Adwan & Smedley, 2012).

In Malaysia, the emergence of online learning has been recognised to penetrate Malaysian educational institutions ever since 1972 when the Ministry of Education set up the Educational Technology Division (Asirvatham, Kaur & Abas, 2005), but it only seems more viable in recent years due to the progressive growth of web-based technologies in Malaysia. According to Khalid, Yusof, Heng and Yunus (2006), more universities in Malaysia have stepped up in offering online-learning environment to students by setting up portals that serve two main functions: 1) as teaching aids that facilitate traditional teaching approach, and 2) as a teaching avenue for off-campus or long-distance programs. In the context of higher education, the emergence of Massive Open Online Courses (MOOCs) and Learning Apps have garnered tremendous attention from educators, administrators and students.

TRIGGERING ACTIVE LEARNING IN STATISTICS WITH EZYSTATS3Q MODEL APPS

Statistics is an invaluable tool employed by statisticians to make sense of the huge amount of data that can be accessed readily nowadays. Statistics seek to show both the representational and inferential properties of a data set. It has high utility value in empirical studies be it in the Sciences, Economics, Business or Social Sciences. The appropriate usage and optimal utilization of this tool assures an output that can provide accurate and relevant information for making good decisions. The ability to extract quality information from the data depends to some extent, on the statistical background and data-analytic skill of the users. Thus, it is vital that students are equipped with the appropriate statistical skills for them to function intelligently and effectively in the society.

However, all fields have technical terms with specific meanings. In many cases, statistics uses words that are already known, but give them specific meanings. For instance "significance", "hypothesis", "confidence", "error", "normal", "differences", "variance", "relationship", "regression" "parametric" are all common words that statistics uses in specialized ways. Students have to master the statistical meaning of these terms or face the risk of confusion when reading statistics books or talking to statisticians. The problem is not that students do not understand a technical term, but they think they know what the term means, but are actually wrong. Furthermore, statistics is a branch of math so to understand the basis of statistics students need to delve into the mathematical details even though they do not need to know much math to use statistics effectively and to correctly interpret results. Hence, based on an informal study, 90% of the respondents in a blog (Agresti & Meng, 2013) commented about how difficult statistics is or how much they hate the subject.

However, statistics instruction has not always been aligned with the practice of statistics, with research into how students learn statistics or with students' needs and interests. One challenge has been that statistics is often

taught by instructors whose primary training lies elsewhere. For example, statistics courses are often taught by mathematicians whose background may include only theoretical courses, if any, in statistics. There have been numerous recent recommendations for improving the instruction of statistics. For example, recommendations of a joint committee of the American Statistical Association (ASA) and the Mathematical Association of America (MAA) with regard to the teaching of statistics are to:

- 1. teach statistical thinking,
- 2. emphasize data and concepts, not theory and recipes, and
- 3. promote active learning.

Active learning refers to the process of engaging students in various learning activities such as reading, problem solving, writing, etc. and these are the classroom activities that enable students to analyse and evaluate their learning in the class. The whole process of active learning is based on the activities and level of engagement (Prince, 2004). Active learning can also be referred to as query learning. However, it is known as a sub part of machine learning under which people learn by raising various queries and questions which help them to learn from different perspectives and looking at the bigger picture of a problem and learn the ways to solve it (Settles, 2010). Similar foci can also be seen in the recent NCTM Standards that call for teaching data analysis, probability, and statistics throughout the K-12 curriculum and the new Advanced Placement Statistics program in the United States. The Conference Board of Mathematical Sciences has issued Guidelines for Mathematical Preparation of Teachers that recognize the importance of statistics and call for more thorough preparation of instructors. The "Teaching Contemporary Statistics with Active Learning" workshops, sponsored by the ASA since 1998, are designed to enable instructors to improve their teaching of statistics. The focus of the workshops is on demonstrating alternative instructional methods for promoting deeper understanding of fundamental statistical concepts by providing instructors with numerous examples of activities that can be directly implemented in the classroom. Secondary goals include enhancing use of technology and authentic assessment practices in statistics courses, while providing a myriad of print and electronic resources for teaching statistics. Researchers in the United States believe they illuminate some of the distinctions between statistics and mathematics and illustrate how one can teach statistical thinking with real data and active learning.

EVALUATION OF EZYSTAT3Q MODEL APP

New technologies allow increased focus on concepts rather than calculations, and numerous resources are now available that enable instructors to focus on (and assess) statistical thinking in an interactive, collaborative, and engaging environment. In fact, researchers at Harvard University view statisticians as one of the most promising job for the next ten years. Professor Meng from Harvard University quoted Hal Varian, Google's Chief Economist "... the sexy job in the next ten years will be statisticians. People think I'm joking, but who would've guessed that computer engineers would've been the sexy job of the 1990s?" (Meng, n.d., para. 1). Many researchers have also pointed out that that in today's workplace, one must not only be able to look at data, understand and process it but also be able to extract value from it, visualize it and communicate it. Such skills will be hugely important skills in the next decades, not only at the professional level but even at the educational level for elementary school kids, high school and college students. Professor Meng added that because now we really do have essentially free and ubiquitous data, statistics should be seen as an important 21st century skill (Meng, n.d).

To date, many instructors/researchers in the United States have presented anecdotal evidence suggesting that active learning is effective (e.g., Knypstra, 2009; Bates Prince, 2009) and others have presented evidence that students' exam scores are higher when taught with an active learning approach than when taught with more traditional approaches (e.g., Christopher & Marek, 2009; Steinhorst & Keeler, 1995; Ryan, 2006; Yoder & Hochevar, 2005). Certainly, *what* students do and *how they think* about what they do determine whether a given active learning approach will be successful.

Therefore, this product referred to as the EzyStat3Q Apps is a handson guide developed by the writers of this paper to lead university students and researchers to learn the tricks of statistics quickly and electronically. EztStats3Q was built using Coursesites by Blackboard. The lessons notes uploaded on EzyStats3Q application was developed with a mashup of other programmes and applications such i-spring, flash, MS Powerpoint, MS Word and MS Excel. Coursesites templates and links also provide online access to a host of other active learning applications such as wikis, blogs and discussion boards. As a comprehensive content and learning management system, it also facilitates tools for creating and managing

exams, browser lockdown during test and a link to resources on McGraw-Hill. This mashup of applications increase the versatility of the application and promotes active learning through a hands-on, constructivist approach. Blackboard Inc. (Nasdaq: BBBB) is a global leader in enterprise technology and innovative solutions that improve the experience of millions of students and learners around the world every day. Founded in 1997, Blackboard is headquartered in Washington, D.C., with offices in North America, Europe, Asia and Australia. Blackboard's solutions allow thousands of higher education, K-12, professional, corporate, and government organizations to extend teaching and learning online, facilitate campus commerce and security, and communicate more effectively with their communities. Its many features, which allow one to manage courses, grading and assessments, and social collaboration, are the standard against which other learning management systems are measured. The blackboard has been used to add static material for students to view, such as pages, links, and media. Then, interaction to the Statistics course has been added with discussion boards, blogs, and wikis. Most importantly, the app engages students in the course by communicating with them, assessing them, and putting them into groups through the active learning approach. Furthermore, the EzyStats3Q Model Apps has the advantage of making the learning of statistics easy by introducing 3Q models namely quick notes, quick steps and quick tables in the system. User friendly and interesting lessons which integrate materials from PowerPoint, word and SPSS software make it easy to ramp up on the latest gadgets: i-phone, i-pad, surface and laptop.

Students only need to follow the course step by step to learn quickly how to do statistical analysis and produce great looking tables and statistical analysis reports. Students become active learners with the apps and are able to share knowledge and to collaborate learning with other learners and lecturer in the on line discussion and forum. The apps also allows students to learn on their own pace at anytime and anywhere. Multimodality concept adopted also allows students to learn statistics from printed material, interactive multimedia PowerPoints and versatile social media apps. Finally, this practical, impressive and fast-paced guide has the potential to be commercialised locally and internationally.

OVERVIEW OF EZYSTATS3Q MODEL

Accessibility

Accessing the EzyStats3Q Model requires internet connectivity. The app can be accessed through any browser and most gadgets that support the html coding of Coursesites. The current home page of EzyStats3Q Model is https://easystats.coursesites.com/ (Figure 1). At the homepage, students or course participants may login by clicking on the login icon or on Easystats 3Q Model under My Courses. Clicking on the login icon will bring them to the sign in page. They enter their username and password if they already have them. New users may click on "sign up" and follow the instructions to create an account or they may sign in using the social media icons listed.



Figure 1: Easystats 3Q Model Homepage

Clicking on Easystats 3Q Model will take the users to the enrolment page (Figure 2). They may click on the self-enrol icon and at the prompt enter the enrolment password which is "6800". They can click on the login icon if their instructor has already enrolled them as a student.

If their login is successful, they will be directed to the instructor's coursesites homepage. They then click on "Easystats 3Q model" to access the course homepage.

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Figure 2: Easystats 3Q Enrolment Page

EVALUATION OF EZYSTAT3Q MODEL APP

This will bring the users to the course homepage (Figure 3).

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Figure 3: Course Homepage

On the left column is the control panel. The users will be able to access the following tools from this column.

Chapter Notes

The first item on the panel listed the eleven chapters of statistics which make up this course. Each chapter is presented in the form of quick notes, quick steps and quick tables. The chapters are formatted and presented as PPT and Flash files.

FAQs

FAQs is a list of frequently asked questions regarding statistics.

Course Dialogue

Forums are made up of individual discussion threads that can be organized around a particular subject and create Forums to organize discussions among instructors and students.

Blogs

Blogs are an open communication tool for students to share their thoughts. Blogs can be created by groups or individual students.

Assessment

Instructors may post their assignments here. Assignments can be set to be viewed by students according to a timeframe.

New and Due

Instructors may use this page to post announcements to students. It also holds the datelines for tasks due and past due.

Study Aid

Study Aid contains the modules for the course in e-book and pdf format.

Course Basics

Course basics contain information on a recommended reading list for the course.

Instructor Info

Users may find information regarding the instructors and tutors for the course here.

My Grades

Students may view their grades at this page.

Calendar

Calendar is a useful tool where instructors can make note of due dates for tasks and activities.

Our Wiki

Collaborate provides tools for constructing a wiki. In this course, both students and instructors can construct their own collaborative wikis.

A Wiki is a collaborative tool that allows users to contribute and modify one or more pages of related material.

E-mail

Instructors can send email to all or selected individual users, students, groups, teaching assistants, instructors or observers.

The tools listed above are available for both instructors and students. Some tools such as creating tests and surveys are only visible to instructors. Test created on coursesites can be taken by students within a folder and the instructor has the option of activating browser lockdown whereby students will not be able to browse the net while taking a test on the same gadget.

RESEARCH METHODOLOGY

This study employed a mixed methods study so that both quantitative and qualitative descriptions of the relevant features of the EzyStats3Q Model App can be collected. Hence, the study used research instruments such as questionnaires and interview questions to collect data from two intact groups of postgraduate students. A questionnaire using a 5 point Likert-scale was developed by the researchers based on an earlier study by the researchers (Chan et al., 2012) in the evaluation of item analysis software. Both open-ended and closed-ended questions were listed in the questionnaire to gauge the perceptions of postgraduate students on the effectiveness of EzyStats3Q Model in the learning of statistical analysis. In order to gain a better insight into the use of EzyStats3Q Model App in higher education, open-ended questions were also used to interview five postgraduate students in the masters programme on their opinions and suggestions to improve the EzyStats3Q Model App.

A descriptive research design was used to analyse the quantitative data collected from the questionnaires. The study investigated the descriptive features of the research variables of ease of use, user interface, audience appeal, effectiveness, presentation, program content, and documentation. Descriptive statistical analysis such as mean and standard deviation was used to analyse the quantitative data. However, for the qualitative data

collected from the open-ended questions and interviews, theme analysis was used to identify the key issues raised by the respondents.

FINDINGS

Profiles of Respondents

The demographic profile included in this analysis entailed gender, ethnicity, and age of the respondents. The results in Table 1 show the frequency and percentage for respondents' gender, ethnicity and age. A total of 87.8% of the respondents are females and 12.2% are males. The composition also indicates that 93.9% of the respondents are Malay and 91.8% of them are more than 25 years old.

Variable	Frequency (n=49)	Percent (%)
Gender		
Female	43	87.8
Male	6	12.2
Ethnic		
Malay	46	93.9
Others	3	6.1
Age		
Less than 25 years old	3	6.1
25 to 30 years old	45	91.8
Missing	1	2.1

Table 1: Gender, Ethnicity, and Age

EZYSTATS3Q MODEL APP EFFECTIVENESS CRITERIA

As shown in Table 2, the respondents slightly agreed that screen directions were consistent and easy to follow (M = 3.96, SD = .676) and users could exit from any screen (M = 3.84, SD = .657). Besides, the respondents agreed that the program responded to input as indicated by directions (M = 3.84, SD = .590) and they could control the pace and sequence (M = 3.82, SD = .601). They also found that the title sequence was brief and could be
bypassed (M = 3.82, SD = .635) and users navigated through the program without difficulty (M = 3.61, SD = .812). These findings indicate that EzyStats3Q Model App has managed to fulfil the first determining criteria of ease of use.

The respondents viewed the EzyStats3Q Model App's user interface characteristics positively. They found the user interface easy to understand (M= 4.02, SD= .777), the icons used to assist navigation clear and intelligible (M= 3.88, SD= .696) and the interface provided users with an appropriate environment (M= 3.88, SD= .526). The respondents also agreed that users could easily navigate through the program (M= 3.88, SD= .640) and were given feedback when errors were committed (M= 3.67, SD= .834).

Most of the respondents agreed that the program matched interest level of indicated audience (M= 4.24, SD= .662) and expected input was appropriate for indicated audience (M=4.14, SD= .577). Besides that, the respondents also agreed that the required time was compatible with user attention (M= 4.00, SD= .689) and examples and illustrations were suitable for the indicated audience (M= 3.94, SD= .689).

Table 2: EzyStats3Q Model App Effectiveness Criteria

EzyStats3Q Model App Effectiveness Criteria	Mean	Std. Deviation
Ease of Use of EzyStats3Q Model App		
Screen directions are consistent and easy to follow.	3.96	.676
Users can exit from any screen.	3.84	.657
Program responds to input as indicated by directions.	3.84	.590
Users can control pace and sequence.	3.82	.601
Title sequence is brief and can be bypassed.	3.82	.635
Users can navigate through program without difficulty.	3.61	.812

User Interface of EzyStats3Q Model App		
The user interface is easy to understand. The icons used to assist navigation are clear and	4.02	.777
intelligible. Interface provides users with an appropriate	3.88	.696
environment.	3.88	.526
Users can easily navigate through the program.	3.88	.640
Users are given feedback when errors are committed.	3.67	.834
Audience Appeal of EzyStats3Q Model App		
Program matches interest level of indicated audience.	4.24	.662
Expected input is appropriate for indicated audience.	4.14	.577
Required time is compatible with user attention.	4.00	.677
Examples and illustrations are suitable for indicated audience.	3.94	.689
Effectiveness of EzyStats3Q Model App	4 99	715
This is an appropriate use of App for data analysis.	4.22	.710
Students are able to recall and use data analysis.	4.00	.751
information presented	3 98	559
Students develop further interest in topic of data	0.00	.000
analysis from using the program.	3.98	.692
Presentation of EzyStats3Q Model App		
Text is clear and printed in type suitable for target		
audience.	3.90	.714
Examples and illustrations are relevant.	3.90	.549
There is appropriate variety in screen displays. Information is presented in a developmentally	3.90	.586
appropriate and logical way.	3.86	.540
Spelling, punctuation, and grammar are correct.	3.85	.684
Program Content of EzyStats3Q Model App		
Information is current and accurate. Assessment strategies are based on current trend in	4.12	.600
assessment. Program matches stated objectives of statistical	4.02	.692
analysis	4 00	707
Program addresses various data analysis needs	3.98	.692
Program is free of stereotypes.	3.90	.653

EVALUATION OF EZYSTAT3Q MODEL APP

Documentation and Supplementary Materials of				
EzyStats3Q Model App				
Learning activities that facilitate integration of software				
into curriculum are provided.	3.96	.576		
Objectives are clearly stated.	3.96	.611		
Professional knowledge that facilitates integration into				
curriculum is provided.	3.86	.612		
Necessary technical documentation is included.	3.58	.739		

Scale: 1= Strongly Disagree, 2=Disagree, 3=Slightly Agree, 4=Agree, 5=Strongly Agree

The respondents reported they agreed about the effectiveness of EzyStats3Q Model App in preparing students for real data analysis (M= 4.22, SD = .715) and it was an appropriate use of instructional software for data analysis (M = 4.08, SD = .731). The respondents also agreed that they were able to recall and use data analysis information presented (M = 3.98, SD = .559). Besides, EzyStats3Q Model App could help students to develop further interest in topic of data analysis from using the App (M = 3.98, SD = .692).

The majority of the respondents indicated a high mean score with regards to the text clarity and its print which was suitable for the target audience (M = 3.90, SD = .714). They were also satisfied with the relevant examples and illustrations (M= 3.90, SD = .549). They agreed that there was appropriate variety in screen displays (M = 3.90, SD = .586) and that information was presented in a developmentally appropriate and logical way (M= 3.86, SD = .540). Furthermore, the respondents also agreed about the accuracy of spelling, punctuation, and grammar (M= 3.86, SD = .684).

Generally, the respondents agreed that the information in the program was current and accurate (M=4.12, SD = .600) and the assessment strategies of the particular software were based on current trend in statistical analysis learning (M= 4.02, SD = .692). Hence, the respondents indicated a high mean for the item, "The program matches stated objectives of statistical analysis" (M= 4.00, SD= .707). The respondents also agreed that the App addressed various statistical analysis needs (M= 3.98, SD= .692) and the App was free of stereotypes (M= 3.90, SD= .653).

Besides that, the majority of the respondents agreed that learning activities that facilitated integration of the App into curriculum were provided (M= 3.96, SD= .576) and the EzyStats3Q Model App's objectives were clearly stated (M = 3.96, SD= .611). They also agreed that professional knowledge that facilitated integration of the app into curriculum was provided (M= 3.86, SD= .612) and necessary technical documentation was included (M= 3.58, SD= .739).

Further data for the effectiveness criteria of the EzyStats3Q Model App was obtained from the findings of the semi-structured interviews. The findings revealed that more voice over on learning content should be included in EzyStats3Q Model App. However, some of the respondents highlighted that the design of the App can still be improved further. To illustrate, Respondent 1 stated, "The weaknesses that still exist is relating to the colours used for wordings because they do not have much contrast". As for documentation and supplementary materials, a total of five respondents highlighted that the App should include an online PDF manual for users, and an online suggestion box for users to provide feedback and suggestions for improvement.

Apart from that, EzyStats3Q Model App still needs to overcome the downloading of learning content problem because sometimes, it takes too much time to download a learning module. Several respondents suggested that EzyStats3Q Model App should be made available even when they go offline. In addition, the respondents also suggested that the App should provide multiple choice questions for each of the topics and lets the users test themselves to see their level of statistical knowledge.

As a conclusion, most of the respondents believed that students and researchers would definitely adopt EzyStats3Q Model App because it would save the learners' and researchers' time in learning statistics. One of the respondents stated that, "Students won't have problems even when they learn statistics without an instructor. Researchers can also use the App to learn the tricks to answer their research questions by using the right statistical analysis techniques" (Respondent 3). Another respondent agreed that "It can reduce instructors' workload because instructors can use this App to teach statistics in their class" (Respondent 4).

EVALUATION OF EZYSTAT3Q MODEL APP

Furthermore, Respondent 5 agreed that EzyStats3Q Model App can make instructors become an expert in the teaching and learning of statistical analysis. She stated, "Instructors must adopt it because instructors and students can collaborate with others from outside the university in the forum; this collaboration will make the questions more critical and valid. This is important to see students' understanding, and with EzyStats3Q Model App, this is possible".

In addition, the respondents felt that EzyStats3Q Model App can improve the knowledge of statistical analysis of undergraduate and postgraduate students because EzyStats3Q Model App can help students to learn statistics anytime, anywhere and anyhow. Coursesites templates and links provide online access to a host of other interactive learning modes such as wikis, blogs and discussion boards making it easy to ramp it up on the latest gadgets: i-phone, i-pad, surface, laptop and desktop. Furthermore, this ubiquitous model of learning across various platforms allows increased focus on concepts rather than calculations. Apart from that, EzyStats3Q Model App also allows sharing among instructors. Indirectly, it can contribute to the sharing of expertise among the instructors because "instructors can share questions and learning content among themselves. Due to sharing of questions and content, instructors will be able to know the problem of statistical analysis in a more effective way" as indicated by a respondent (Respondent 2). In addition, another respondent highlighted that "EzyStats3O Model App makes the learning process faster and easier. It also gives ideas on how to teach analysis from the examples provided inside the EzyStats3Q Model App" (Respondent 4).

IMPLICATIONS AND CONCLUSION

As the pace of changes in educational technology continues unabated, it is essential to reflect on those transferable principles of our practice that will be of benefit to others. The implications of e-learning are that learning and teaching have been moved to desktop, laptop, and mobile devices where teaching and learning can take place in self-paced (asynchronous) formats or in virtual classes through the use of synchronous tools. As e-learning technologies have become more advanced, learning can be customized automatically based on an initial assessment of learner needs. Some

experts also see the evolution of learning content toward shorter learning chunks. Technologies that enable threaded discussion groups, chat rooms, synchronous meeting tools, and other collaborative software are among technologies being adopted in e-learning settings (Stoltenkamp & Mapuva, 2010). Hence, more advanced tools, such as Learning Apps and MOOCs that archive unstructured knowledge resources in ways that can quickly be searched through keyword, form the next step in developing e-learning. By using these social media tools, basic requirements for knowledge-on-demand learning can be presented by anyone at anytime and anywhere delivery of education and training, adapted to the specific requirements and preferences of each individual citizen within different e-learning settings (Wong, 2003).

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THE RELATIONSHIP BETWEEN EMOTIONAL INTELLIGENCE AND SELF-REGULATED LEARNING IN LEARNING ENGLISH AS A FOREIGN LANGUAGE AMONG UNDERGRADUATE STUDENTS

Tahmasbipour, N.¹ Shaabani, M.²

Faculty of Human Sciences, Shahid Rajaee Teacher Training University, Tehran, Iran *E-mail: ¹ n.tahmasbipour.45@gmail.com* ² m.shaabani66@yahoo.com

ABSTRACT

This study explored the relationship between emotional intelligence (EI) and self-regulated learning (SRL) in learning English. Using simple random sampling, 189 male and female undergraduate students were selected. These students were pursuing a general English course in Islamic Azad University of Marvdasht, Iran. The Emotional Intelligence Inventory (EQ-I, Bar-On, 1997) and Motivated Strategies for Learning Questionnaire (MSLQ, Pintrich, 1991) were used to collect data. The results showed that there was a significant and positive relationship between EI and SRL. There was also a significant and positive relationship between EI and motivation as well as learning strategies scales. EI was also positively and significantly correlated with learning strategies as well as motivation subscales except test anxiety.

Keywords: self-regulated learning, emotional intelligence, learning *English*

INTRODUCTION

Learning strategies, according to scholars such as Ellis (2004), are among the factors which in addition to emotional intelligence (EI), learning style, motivation, anxiety, personality, and learner's beliefs, play an important role in language learners' success. Learning strategies are all a sub-part of a larger domain of learning processes which according to Dornyei (2005, cited in Griffith, 2008) involves the management of one's cognitive, motivational, metacognitive, behavioral, and environmental areas. This domain is called by educational theorists as self-regulated learning (SRL). Zimmerman (2001) defines self-regulated learners as those who "are motivationally, metacognitively and behaviorally active participants in their own learning process" (p.5). Such learners are equipped with strategies that help them manage their own learning process and therefore, achieve their academic goals. Based on a social-cognitive approach to learning, Pintrich (1991) divides SRL scales into motivational and learning strategies of which the second one includes learning strategies used in learning English as well. What matters here is that if language learning strategies, or in a more general sense, SRL strategies are effective in individuals' learning achievements, so why are these skills and strategies not used by all language learners? What motivates and helps successful language learners to use these strategies in learning a foreign language while unsuccessful language learners lack such skills?

Salovy (1992, cited in McCombs, 2001) believes that the central core of SRL involves a self-referent process called EI. EI is a person's ability to sustain motivation, persist in difficulties, control impulses, delay gratification, regulate one's own psychological manners, empathize with others, and to be hopeful (Goleman, 1995). In addition, Salovy and Mayer (1990, cited in Goleman, 1995) consider EI as a sub area of social intelligence and define that as one's ability to monitor his/her own feelings and emotions as well as those of others, distinguish between these emotions, and use these information to direct his/her own thoughts and behaviors.

From a phenomenological perspective to the concept of SRL, McCombs (2001) notes that awareness of one's own positive and negative emotions through self-monitoring and self-reflection helps the individual THE RELATIONSHIP BETWEEN EMOTIONAL INTELLIGENCE AND SELF REGULATED

direct his/her thoughts and behaviors. According to such a perspective, EI can be considered as a prerequisite for SRL skill. If this perspective is correct, then it can be hypothesized that higher levels of EI among successful language learners may be the cause of their more skillful use of self-regulatory strategies in comparison to unsuccessful learners. However, such a conclusion is just a conjecture and hypothesis. Therefore empirical research is needed to prove it and it is what this study tried to investigate. It investigated the relationship between EI and SRL in learning English as a foreign language. Two pertinent questions were addressed in this study. The first question is "Is there any significant relationship between EI and SRL in learning English?" The second question is "Is there any significant relationship between EI and SRL scales and subscales in learning English?"

METHODOLOGY

This study was a descriptive and correlational study. The independent variable was EI and the dependent variable was SRL and its scales and subscales. The research sample included undergraduate students from different majors studying a general English course in Islamic Azad University of Marvdasht, Fars, Iran. The participants included 189 male and female students selected through simple random sampling. The Emotional Intelligence Inventory (EQ-I; Bar-On, 1997) and Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich, 1991) were used to collect data. EQ-I was first developed in 1980 and then revised in 1997. Finally, a general scale for EI and five mixed scales as well as fifteen subscales were developed. The reliability of the questionnaire with temporal stability coefficient after one month and after four months was reported by Bar-On as 85% and 75%, respectively. The validity was also confirmed by experts. In 2006, the questionnaire was translated into Farsi by Dehshiri. The Cronbach Alpha for the Farsi transcript was reported as 93%. MSLQ was also developed by Pintrich (1991) to measure individuals' use of SRL strategies. The questionnaire included a motivational and a learning strategies scale and consisted of 81 items. It was translated into Farsi by the researcher and its content validity was confirmed by five experts in the field of education. The Alpha Cronbach was 86%. Both questionnaires were distributed among the participants and 189 completed questionnaires

were returned to the researcher. The collected data were analyzed using SPSS 19 software and by computing Pearson correlation coefficient.

RESULTS AND DISCUSSION

The purpose of this study was to determine the relationship between EI and SRL and its scales and subscales in learning English as a foreign language. The results are presented in line with the research questions. Research Question 1: Is there any significant relationship between EI and

SRL in learning English?

The relationship between EI and SRL was investigated using Pearson correlation coefficient. Primary analysis was done to ensure the assumptions of correlation. As evident in Table 1, the results showed that there was a significant and positive and relatively moderate correlation between EI and SRL, r=.37, p<.000. It means that higher levels of EI are related to higher levels of SRL.

		EI	SRL
EI	Pearson Coefficient Sig. level	1	.376** 0.000
SRL	Pearson Coefficient Sig. level	.376** 0.000	1

Table 1: Correlation between EI and SRL

N=189 (** correlation is very significant at the level of .05)

This finding is in line with Mabekoje's (2011) study on 467 students which showed a moderate, positive and very significant relationship between EI and SRL, too. However, the present study was done exclusively in English classes and among university students. On the other hand, such finding confirms the positive and significant relationship that McCombs (2001) considers between EI and SRL. However, it should be taken into account that McCombs' claim regarding the central role of EI in SRL may refer to a strong type of correlation between these two variables while the present study shows only a moderate correlation. What matters here is that THE RELATIONSHIP BETWEEN EMOTIONAL INTELLIGENCE AND SELF REGULATED

despite different levels of correlation that may be reported by different studies for EI and SRL, regulation and management of emotions cannot be considered as distinct from self-regulatory processes. As Vohz and Baumeister (2011) note, EI and SRL processes are intricately intertwined since people in the process of self-regulation often encounter situations which stimulate emotions and therefore, a need to manage them. The importance of this issue is the extent that Corno (2001) enumerates emotion regulation as one of the main SRL components. And finally, the positive and significant relationship between EI and SRL as evident in this study is in line with the findings of Bown and White (2010) showing that affective domain plays an important role in learning a foreign language and language learners' emotional and affective experiences should be taken into account and dealt with at a larger and deeper perspective and through approaches such as self-regulation.

Research Question 2: Is there any significant relationship between EI and SRL scales and subscales in learning English?

The relationships between EI and SRL scales and subscales were also determined by computing Pearson correlation coefficient. The results showed that there was a moderate, very significant and positive relationship between EI and the motivation scale, r=.42, p<.000 (Table 2). The relationship between EI and motivation according to the findings was of a moderate level. What should be considered with regard to this is that motivation itself includes other domains such as cognitive and social too, and therefore, there may be other factors as well that contribute to the maintenance and promotion of motivation. However, the positive and significant relationship between EI and motivation in this study is consistent with the findings of Maheshwari et al. (2013), Nga and Leung (2011) and Maraichelvi and Rajan (2013). It is also in line with studies that show such a correlation in the context of learning English such as Rostampour and Niroomand (2013) and Prieto (2010).

	Motivation	Task value	Self- efficacy	Intrinsic goal orientation	Extrinsic goal orientation	Control of learning beliefs	Test anxiety
ElPearson Coefficient	.424**	.452**	.426**	.335**	.324**	.162**	101
Sig. level	.000	.000	.000	.000	.000	.026	.166

Table 2: Correlation between El and Motivation Scale and its Subscales

N=189 (** correlation is very significant at the level of .05)

Table 2 shows the results of the relationship between EI and the scale and subscales of motivation. As evident, task value had the highest level of positive and significant correlation with EI in comparison to other motivational subscales, r=.45, p<.000. EI helps individuals control their negative impulses and emotions while facing a learning task and deal with it with a better mental status. This is an important point since educational theorists like Sergiovanni and Starrat (2008) consider learner's mental status as one of the key factors in his/her motivation for doing the task and achieving success in it. The study also showed a positive, moderate and very significant relationship between EI and self-efficacy, r=.42, p<.000, which is in line with the findings of Chan (2004) and Rastgar and Memarpoor (2009) as well as the study done by Hashemi and Ghanizade (2011) on language learners. This may show that individuals' and particularly language learners' beliefs about their own capabilities are related to their ability and skill in managing their own emotions, something which is in agreement with the views of those like Bandura (Schunk, 2001) who believes that human functioning of which learning is a part, is the result of interaction between personal, behavioral, and environmental factors that all influence one's self-efficacy.

The study also showed a positive and significant correlation between EI and intrinsic goal orientation, r=0.33, p<.000, as well as extrinsic goal orientation, r=.32, p<.000. In other words, EI was positive, moderate and very significantly related to language learners' intrinsic and extrinsic motivation. Intrinsic and extrinsic motivation are in fact two aspects of motivation which according to the findings of the present research

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had approximately equal correlation with EI. EI was also positively and significantly but weakly related to control of learning beliefs, r=.16, p<.026. However, the relationship between EI and motivational components indicated that there was no significant correlation between EI and test anxiety. Studies done by Malek et al. (2012), Khaledian et al. (2013), and Gupta and Duta (2012) all showed a negative and significant relationship between EI and test anxiety; findings which are not in line with the results of the present study.

Learning strategies scale is the second key component of SRL of which the relationship with EI was determined. Data analysis shows a weak, positive and very significant relationship between EI and the learning strategies scale, r=.27, p<.000. In line with these findings are the studies by Nga and Leung (2011) on university students and Nosratinia et al. (2013) on language learners that showed a positive and significant relationship between EI and learning strategies. It should be noted here that learning strategies include techniques which are used by learners in order to learn or manage learning and are often acquired through direct or indirect instruction. The acquired nature of learning strategies can be the reason for the weak correlation of this scale with EI, since learners need instruction and training to be equipped with these strategies and use them even though their EI may be high. Table 3 shows the level of correlation between EI and learning strategies scale and its subscales.

Table 3: Correlation between El and Learning Strategies Scale
and its Subscales

	Learning strategies	Resource management strategies	Metacognitive strategies	Cognitive strategies
El Pearson Coefficient	.279**	.281**	.242**	.239**
Sig. level	.000	.000	.001	.001

N=189 (** correlation is very significant at the level of .05)

With regard to learning strategies, Table 3 indicated a weak, positive and very significant relationship between EI and resource management strategies, r= .28, p<.000, and a weak significant and positive correlation was also indentified with cognitive strategies, r=.23, p<.001. Among

resource management strategies and also among all learning strategies, a moderate and very significant and positive relationship was identified with EI which was related to effort regulation strategy, r=.38, p<.000 (Table 4). Pintrich's (1991) definition of effort regulation can be helpful in understanding and explaining such a finding. Pintrich defines effort regulation as a commitment to achieving one's learning goals even in the face of difficulties and distractions; effort regulation not only shows goal commitment but also regulates the continuous implementation of learning strategies. Based on such a perspective, effort regulation can be considered as related to goal setting, specifying long and short-term goals and the steps to achieve them as well as the persistence in achieving those goals. Such persistence in the learning process is important and critical. In this regard, Corno (2001), assuming a volitional perspective to SRL, cites from Ach (1910) that motivation provides the primary stimulus for an action while volition controls and manages the individual's impulses and tendencies and protects motivation so the action is sustained and ultimately done. Considering the role that Ach assumes for volition, it can be concluded that volition is directly related to EI which is defined by Goleman (1995) as a person's ability to sustain motivation, persist in difficulties, control impulses, delay gratification, regulate one's own psychological manners, empathize with others, and to be hopeful. Accordingly, it is understood that effort regulation as a strategy to persist in the learning process, achieve one's goals, and to prevent demotivation and frustration, which all have great importance in the process of learning a foreign language, requires emotion management skills and is related to them.

In addition, the study showed a positive and significant correlation between EI and study time and place management strategy, r=.23, p<.001; a relationship which is confirmed by Kavousy et al. (2010) in a study on medical students. However, it is necessary to note that time management plays an important role in effort regulation and goal achievement and perhaps it can be considered as an element of effort regulation strategy and therefore related to EI skills.

In spite of the significant relationship between EI and effort regulation and time and place management strategies, the study shows no such correlation between EI and peer learning and help seeking strategies which in fact refer to social dimensions of resource management. Regarding such THE RELATIONSHIP BETWEEN EMOTIONAL INTELLIGENCE AND SELF REGULATED

strategies, the researcher believes that learners' and language learners' social experiences in the instructional context should be taken into account. Students' lack of such experiences in traditional contexts of language classes or other classes which do not encourage learning through social and interpersonal interactions may be the reason for their reports showing these strategies were not used by them. Given the interpersonal skills (Bar-On, 1997) and relationships management (Goleman, 1998) components of EI and according to what was discussed above, it is understood that EI cannot be considered unrelated to participatory and cooperative learning just based on the findings of the present study but it may be needed to systematically and purposefully situate learners' language learning activities and experiences in a social and interactive context.

Fable 4: Correlation betweer	n El and Resource	Management Str	ategies
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	Effort regulation	Time and place management	Help seeking	Peer learning
El Pearson Coefficient	.388**	.230**	.104	.092
Sig. level	.000	.001	.153	.207

N=189 (** correlation is very significant at the level of .05)

Metacognitive strategies component is another group of learning strategies which was positive and very significantly related to EI based on the results of the study, r=.24, p<.001 (Table 3). This group of strategies is concerned with the management of learning process through techniques such as self-evaluation and self-monitoring. The positive and significant relationship between EI and metacognitive strategies was also confirmed by Sharei et al. (2012) in learning mathematics as well as Alavinia and Mollahossein (2012) in learning English; studies which are consistent with the present one. However, Fouladi (2012) showed no significant relationship between these two variables in his study on language learners.

As Tables 3 and 5 show, cognitive strategies and its components including rehearsal, critical thinking, organization, and elaboration also correlated positively and significantly but weakly with EI according to the present study. Again it must be noted that learning strategies and particularly, cognitive strategies such as elaboration or critical thinking are

techniques which demand direct or indirect instruction and higher levels of EI cannot by itself ensure the implementation of such strategies by the learners, a point completely evident in the findings of the present study.

	Rehearsal	Critical thinking	Organization	Elaboration
El Pearson Coefficient	.263**	.237**	.179**	.148**
Sig. level	.000	.001	.014	.042

Table 5: Correlation between El and Cognitive Strategies

N=189 (** correlation is very significant at the level of .05)

CONCLUSION

The purpose of this study was to determine the relationship between EI and SRL and its scales and subscales in learning English as a foreign language. The analyses of the collected data showed that there was a positive, very significant and relatively moderate relationship between EI and SRL in learning English. There was also a positive, moderate and very significant relationship between EI and scales of motivation and learning strategies. In addition, EI was weakly to moderately, positively and very significantly related to motivational subscales except test anxiety. A weak, positive and very significant relationship was also found between learning strategies subscales including cognitive, metacognitive, and resource management strategies. Among resource management strategies, help seeking and peer learning were not correlated significantly with EI.

The findings of the study shows the importance of EI skills in promoting SRL skills in the process of learning English as a foreign language. Learners in today's world must be equipped with skills and strategies to be able to assume the responsibility of their own learning and become independent learners. According to Bandura (1995), the realities of the educational systems in the modern world require individuals to acquire self-regulatory skills in order to be able to meet life demands in modern societies. Accordingly and in line with what was discussed, THE RELATIONSHIP BETWEEN EMOTIONAL INTELLIGENCE AND SELF REGULATED

implementing such skills and strategies in the process of learning a foreign language is of great importance since a large part of the responsibility for learning a language is on the learners themselves who must acquire the essential language skills through active participation in the learning process. Therefore it is very important to provide the essential conditions for learners to acquire self-regulatory skills. As a result of this and based on the findings of the present and other studies, instruction of EI skills and equipping language learners with such skills can promote their self-regulatory skills and help them manage their learning of a foreign language. The findings of this study help language learners provide the required conditions for better acquisition of language skills and also help language teachers and instructors act more effectively in improving learners' self-regulatory as well as EI skills and therefore, their language learning capabilities.

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STUDENTS' ATTITUDES TOWARDS MATHEMATICS

Teoh Sian Hoon Jetrecella Binti Surubi Faculty of Education, Universiti Teknologi MARA *E-mail: teohsian@salam.uitm.edu.my*

ABSTRACT

Students in their transition between primary school and secondary school are likely to experience adaptation issues in terms of teaching approaches and perceptions towards the new curriculum. Teachers' effort in assisting the students to adapt to the change becomes easier if they are provided with information about the students' attitude towards the new learning experience. This study investigated students' attitudes towards the learning of mathematics. An attitude scale instrument was distributed to 63 Form One students who participated in the study. The overall findings revealed that most of the students showed moderate positive attitude towards mathematics. This has implications for higher education institutions involved in the training of mathematics teachers.

Keywords: attitudes, mathematics, students

INTRODUCTION

Students' mathematics achievement has become a major concern especially among those involved in the field of mathematics teaching and learning. Studies have been carried out looking at factors that cause difficulties in solving mathematical problems. The factors are classified into dimensions of student personal variables, instructional variables and environmental variables (Walberg, 1981; Meece, Wigfield & Eccles, 1990; Akinsola & Olowojaiye, 2008). Apart from that, there have also been studies which

compared students' achievement in mathematics by looking at factors such as gender, student background and approaches used in teaching (Tapia & Marsh, 2001; Yimaz, Altun & Olkun, 2010). For instance, studies by Walberg (1992) and Tsai and Walberg (1983) revealed that students' achievement and attitude towards mathematics are dependent on quite a number of different variables. In addition, the focus on lifelong learning emphasises the need to develop mathematical skills within each individual, in order to achieve significant improvement or become more competent in mathematics. Findings revealed that more effort is needed in order to assist students in achieving better results in the area of mathematics learning (Yimaz, Altun & Olkun, 2010).

It is a known fact that there are differences in terms of approaches of mathematics content delivery between secondary and primary schools. Students who are in their first year in secondary school need to adapt to secondary school learning environment. Hence, if these students are able to get assistance to adapt to the learning environment, they may become successful in their learning. Individual adaptation to the environment will result in different attitudes towards learning. Wilkins and Ma (2003) emphasized that the variables of attitude change at different stages of secondary school. The attitudes are significant to be observed since there is correlation between school achievement and students' attitude in learning mathematics (Mohd et al., 2011; Muhammad & Syed, 2008; Papanastasiou, 2000). In view of the aforementioned discussion, this study was conducted to investigate the level of attitude towards mathematics among secondary school students, focusing on the general overall attitude and also three specific domains: affective, behavioral and cognitive.

The research questions are:

- 1. What is the students' overall attitude towards mathematics?
- 2. What is the students' attitude towards mathematics in terms of affective domain?
- 3. What is the students' attitude towards mathematics in terms of behavioral domain?
- 4. What is the students' attitude towards mathematics in terms of cognitive domain?

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LITERATURE REVIEW

The term attitude has various definitions as it depends on the purpose of what we are using it for (Zan & Martino, 2007; Akinsola & Olowojaiye, 2008). The word attitude refers to manners, dispositions or feelings that one has towards another person or a given object. Most of the time people experience feelings such as love, hate, dislike, like, agree and disagree and all of these feelings are evaluative responses to an entity or object. Hence, attitude is known as a description for evaluation of a specific object in mind (Bohner & Wanke, 2002). Meanwhile, according to Eagly and Chaiken (1998), attitudes are often regarded as beliefs. On the other hand, psychologists define attitude as a tendency to evaluate things in certain ways. It includes evaluations of people, issues, objects or events and that evaluations can either be positive or negative. Generally, attitudes are examined as an evaluation of people's way of dealing with objects or situations as well as issues (Greenwald, 1989, Petty & Cacioppo, 1986). When studying the attitude of an individual, one can predict the individual response to an object or situation (Ajzen & Fishbein, 1977) as positive attitude ensues a positive response whilst negative attitude ensues a negative response.

Exposure to students' attitudes towards learning mathematics is important since cognitive process in mathematical thinking is guided by students' attitudes. In other words, students involve their feelings and reactions in solving mathematical problems. The reactions illustrate individual behavior in dealing with objects or situations such as when solving problems in mathematical questions. Since the reaction involves thinking, attitude towards mathematics also involves the cognitive process. Since attitude is related to feelings, behavior and cognitive process, it can be classified into three separate categories, which are affect (feel), cognition (think) and behaviour (behave) (Ajzen, 1988; Eagly & Chaiken, 1998; Bohner & Wanke, 2002).

Attitude towards mathematics has been studied from many different aspects. The major aim of these studies focuses on students' development in the context of mathematics learning. Apart from that, the findings also aim to provide input on the way how mathematics curriculum helps students in preparing themselves to manage their everyday life challenges,

and in the future help students to major in suitable careers related to science and technology. Several studies have also been done to find the factors affecting students' performance in mathematics. One of the many factors discovered is students' attitude (Papanastasiou, 2000; Mohd et al., 2011; Ma & Kishor, 1997).

Studies have shown that a positive attitude is favorable for good performance and also verified that there is a significant correlation between attitude and achievement (Papanastasiou, 2000; Mohd et al., 2011; Ma & Kishor, 1997). The positive correlation here means that when the attitude of students is increasing (positive), therefore their achievement will increase too. Studies also revealed that prediction of mathematics achievement was significantly predicted by extreme positive or negative attitudes than more neutral attitudes (Bergeson, Fitton & Bylsma, 2000). However, according to Ghanbarzadeh (2001) and Scott (2001), the relationship between students' attitude and their achievement should not be interpreted explicitly. Kiely (1990) showed that on average, a small number of students with positive attitude performed well in mathematics. Meanwhile, Ghanbarzadeh (2001) and Scott (2001) reported that although there is a relationship between attitude and achievement, this relation should not be considered definite, especially for the students who are in their transition from primary education to secondary education. Thus, it is crucial to investigate Form One students' attitude in learning mathematics. The major difference is the students in primary school receive a lot of help from teachers (Borthwick, 2011). This may contribute to the difference in attitude towards mathematics among Form One students in secondary schools.

Based on the Multicomponent (Tripartite Model) model of Attitude (Eagly & Chaiken, 1998; Hovland & Rosenberg, 1960) attitude can be categorized into three components: affective, behavioral and cognitive (Bohner & Wanke, 2002). Brief explanations for the three components are as follows:

- 1. Affective (Emotion): Your feelings about an object, person, issue or event.
- 2. Behavioral (Act): Your behavior which is influenced by your attitude.
- 3. Cognitive (Thinking): Your thoughts and beliefs about a subject.

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METHODOLOGY

Quantitative approach was employed in this study to examine the level of attitude towards mathematics in terms of the three domains, namely affective, behavioral and cognitive. The survey method (questionnaire) was the fundamental research design for this study. The Likert-Scale type of questionnaire was distributed to the respondents involved in the study. The population of this study was Form One students from a secondary school in Shah Alam, Selangor, Malaysia. Using the simple random sampling technique, 63 students were chosen as the sample from the six Form One classes in the school.

The questionnaire used in this study was adapted from the Fennema-Sherman Mathematics Attitude Scales (1976) to meet the needs for this study. It was divided into two parts: Part A focused on the demographic data of the students while Part B focused on the three main variables which formed the core issues investigated in this study (affective, behavioral and cognitive domains). Students had to respond to the statements in the questionnaire using the Likert scale (1-10) where number 1 was the lowest and number 10 was the highest score given, all of which was used to measure the level of attitude towards the statements.

FINDINGS

The results were analyzed descriptively to answer the following research questions.

Research Question 1: What is the students' overall attitude towards mathematics?

Research Question 2: What is the students' attitude towards mathematics in terms of affective domain?

Research Question 3: What is the students' attitude towards mathematics in terms of behavioral domain?

Research Question 4: What is the students' attitude towards mathematics in terms of cognitive domain?

Table 1 shows the means and standard deviation for the overall mean of the attitude as well as means for the domains of attitude. The overall mean and standard deviation were 6.67 and 1.51 respectively. Thus, the outcome for research question one indicated that the overall mean for 'attitude' was 6.67. It was higher than 5.50 (middle point of the domain).

Domain	Mean	Std. Deviation
Affective	7.36	1.61
Behavioral	5.62	1.72
Cognitive	6.97	1.54
Attitude (overall)	6.67	1.51

Table 1: Mean Score and Standard Deviation for Domains of Attitude

Descriptively, the results show that the mean of the affective domain (mean = 7.36, standard deviation = 1.61) was the highest among the domains. Thus, the outcome of research question two indicated that descriptively, students' attitude level towards mathematics in terms of affective was higher than the overall mean attitude and the highest among the domains.

Next, descriptively, the results show that the mean of behavioral domain (mean = 5.62, standard deviation =1.72) was the lowest among the domains. Thus, the outcome of research question three indicated that descriptively, students' attitude level towards mathematics in terms of behavioral was the lowest among the domains.

Last, descriptively, the results show that the mean of cognitive domain (mean = 6.97, standard deviation =1.54) was the closest to the overall mean. Thus, the outcome of research question four indicated that descriptively, students' attitude level towards mathematics in terms of cognitive was average among the three domains.

In conclusion, the results show that on average, the mean score for attitude was descriptively higher than the middle point of the scale. Descriptively, the results revealed that the students showed the highest level of attitude towards mathematics in terms of affective domain and the lowest in behavioral domain.

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For further description, the results of the items for the affective domain are presented in Table 2. The means for all items represented positive values. All values for the negative items for example, "Learning mathematics is a waste of time" were converted to positive value. If the value of data was 10, then it was converted to 1. The scores of the negative items were reversed before the analysis was carried out.

Table 2: Items for Affective Domain

Affective Domain	Mean	Std. Deviation
*Learning Mathematics is a waste of time (the data was reversed to positive).	8.40	2.167
I learn Mathematics well.	6.95	2.196
I enjoy learning Mathematics.	6.76	2.532
I prefer that more time is allocated for Mathematics in the school time table. The students interpreted that learning Mathematics is worthwhile.	5.35	2.754
*Mathematics is boring (the data was reversed to positive).	7.59	2.607
It is important that students learn Mathematics since Year 1.	8.24	2.454
What I learn in Mathematics will be important when I further my study at the degree level.	8.43	2.421
*Mathematics is hard for me (the data was reversed to positive).	6.17	2.366
Mathematics is a worthwhile subject.	7.43	2.388
Mathematics is a necessary subject.	7.73	2.573
*When I hear the word Mathematics, I dislike it (the data was reversed to positive).	8.30	2.219
Mathematics does not scare me at all.	6.92	2.853
Overall	7.36	1.61

*Negative items

The data for the item "When I hear the word Mathematics, I dislike it" was reversed to positive values to indicate the statement "When I hear the word Mathematics, I like it" (M=8.30, SD=2.219). The results showed that descriptively, the mean was higher than the overall mean of 7.36 for affective domain. Other items in the affective domain which showed a higher mean than the overall mean are as listed as follows:

- 1. What I learn in Mathematics will be important when I further my study at the degree level, with mean = 8.43.
- 2. Learning Mathematics is a waste of time (the data was reversed to positive value which became "Learning mathematics is not a waste of time") with mean = 8.40.
- 3. When I hear the word mathematics, I dislike it (the data was reversed to "When I hear the word mathematics, I like it"), with mean=8.30.
- 4. Mathematics is a necessary subject, with mean=7.73.
- 5. The students interpreted that learning mathematics is worthwhile, with mean= 7.59.

The results showed that the students put across the importance of learning mathematics and they emphasized the significance of learning mathematics.

Table 3 shows the results for items for behavioral domain. Only one item in the behavioral domain was reversed to positive value, namely "I never avoid myself from doing more exercises in mathematics in school" (M=6.94, SD=2.879). The results showed that descriptively, the mean was higher than the overall mean (5.62) for behavioral domain. Other items in the behavioral domain which showed a higher mean than 5.62 are as listed below:

- 1. I need to do a lot of mathematics exercises, with mean=7.35.
- 2. I will study hard for my Mathematics in order to get a good job, with mean=7.10
- 3. I always ask the teacher when I do not understand a Mathematics topic, with mean = 6.51

The results showed that the students were aware of the need to be engaged in the learning of Mathematics. Nevertheless, their effort was less as the results showed descriptive lower mean in most of the items on actions taken in the behavioral domain.

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Behavioral Domain	Mean	Std. Deviation
I need to do a lot of Mathematics exercises.	7.35	2.824
I will do extra Mathematics exercises than the ones	5.49	2.264
already given in class.		
I revise more on Mathematics topics compared to other subjects.	4.13	1.955
I always ask the teacher when I do not understand a Mathematics topic.	6.51	2.596
I learn the Mathematics topics first before attending class.	4.40	2.543
I am interested to talk to my Mathematics teachers about a career that applies Mathematics.	4.86	2.717
I have talked to my Mathematics teachers about a career that applies Mathematics.	4.21	1.902
I will study hard for my Mathematics in order to get a good job.	7.10	2.832
I am willing to learn more than the required amount of the contents in Mathematics.	5.08	2.478
I plan to learn Mathematics as much as I can during my education.	5.78	2.948
*I avoid doing more exercises in Mathematics in school (the data was reversed to positive).	6.94	2.879
Overall	5.62	1.72

Table 3: Items for Behavioral Domain

*Negative items

Table 4 shows the results for items in the cognitive domain. Only three items showed means lower than the overall mean (6.67) for cognitive domain. The items are as below:

- 1. I try to relate Mathematics with my everyday life, with mean=6.37.
- 2. I don't expect to use Mathematics after leaving school (the data was reversed to "I expect to use Mathematics after leaving school"), with mean =6.02.
- 3. I make a lot of errors when I calculate Mathematics problems (the data was reversed to "I make less errors when I calculate mathematics problems"), with mean=5.40.

The results showed that descriptively, the students were aware of their thinking about Mathematics, but their confidence level needed to be improved.

Cognitive Domain	Mean	Std. Deviation
*I make a lot of errors when I calculate Mathematics problems (the data was reversed to positive).	5.40	2.393
I can learn Mathematics.	7.32	2.539
What I learn in Mathematics is useful outside class.	7.63	2.438
When I learn Mathematics, I will use it in my everyday life.	7.13	2.406
*Mathematics is not related to the field that I will be involved in (the data was reversed to positive).	6.97	2.851
I try to relate Mathematics with my everyday life.	6.37	2.364
*I don't expect to use Mathematics after leaving school (the data was reversed to positive).	6.02	2.359
*I don't plan to use Mathematics after leaving school (the data was reversed to positive).	7.38	2.854
I'll need Mathematics for my future work.	7.51	2.546
I believe studying Mathematics helps me with problem solving in other areas.	7.05	2.498
Mathematics helps develop the mind and teaches a person to think	7.92	2.567
Overall	6.67	1.54

Table 4: Items for Cognitive Domain

*Negative items

CONCLUSION

In conclusion, the overall findings revealed that most of the students showed moderate positive attitude towards Mathematics. Specifically, the students showed the highest level of attitude towards Mathematics in affective domain and the lowest in behavioral domain. In terms of affective domain, further analyses showed that even though the students liked Mathematics and they involved themselves in thinking, as well as found it an important subject, they clearly did not make the effort to do well in this subject as discovered in the behavioral domain. In terms of

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affective domain as well as cognitive domain, the students were more ready compared to behavioral domain. In view of this, teachers' effort is needed since the behavioral domain, i.e the students' effort in practicing mathematics problems was related to teachers' preparation with regard to materials used and input given in classrooms (Yilmaz, Altun & Olkun, 2010). Hence, the increase in the number of mathematical tasks practices is required among secondary school students during the duration of their study. The need for practice is emphasized since students' attitude will change at different stages of secondary school (Wilkins & Ma, 2003). These findings have implications for higher education institutions involved in the training of mathematics teachers to raise their awareness on the attitudes of students in learning Mathematics.

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THE VOCABULARY LEARNING STRATEGIES OF ESL MATRICULATION STUDENTS IN MALACCA MATRICULATION COLLEGE, MALAYSIA

Nurhamizah Ishak Lee Lai Fong Faculty of Education, Universiti Teknologi MARA *E-mail Address: nhnuriz@gmail.com*

ABSTRACT

This study looked at types of vocabulary learning strategies (VLS) that matriculation students frequently applied and their level of use of vocabulary learning strategies (VLS) categories. Data was collected through a questionnaire from a sample of 140 matriculation students. Strategies of guessing textual contexts, asking classmates for meaning of new words, studying spelling of new words, interacting with fluent speakers, verbally repeating new words, listening to English songs and watching English television programmes or movies were found as the most frequently used vocabulary learning strategies among these students. Meanwhile, vocabulary learning strategies category with the highest level of use was metacognitive-consolidation strategies while socialconsolidation strategies was the vocabulary learning strategies category with the lowest level of use. Among the implications of this study are it provides suggestions to improve vocabulary learning among ESL matriculation students and gives input to English language instructors about vocabulary learning strategies (VLS) among ESL matriculation students. It can also further understanding on vocabulary instruction that can be inculcated in post-secondary educational institutions.

Keywords: vocabulary learning strategies, matriculation students

INTRODUCTION

English is an important language; however, many ESL students including those in post-secondary level face problems with English vocabulary (Abdul Jalil, 2014) which can impair their learning and communication. Without adequate English vocabulary, ESL learners can neither read English texts nor write English essays, as well as listen to and speak in English well. In other words, vocabulary is a key indicator of both one's language learning and one's ability to learn the language (Mayuree, 2007). Cheang, Murugan, Wan Noorli and Ch'ng (2008) found that that limited vocabulary was the main factor for the poor spoken English among diploma students. They were frequently at a loss for words and always used the wrong words when communicating with others. This indicates that lack of vocabulary is also big handicap for students in communication.

According to Azadeh and Ghazali (2011), vocabulary learning generally is not given much emphasis in the Malaysian school system as English is taught in schools mainly for the purpose of examination. Even if vocabulary learning takes place in English classrooms, they are largely incidental. This means that when a particular word or phrase appears difficult for students, they are informed of its definitions without further explanation of its usage or limitation (Gidey, 2008). This approach to vocabulary learning may lead to inadequacy in vocabulary knowledge among students and the problem continues when they move to postsecondary education.

For matriculation students, English language is their instructional medium. Their limited English vocabulary could hamper their comprehension of the subjects taken and eventually, cause low academic performance as they are unable to write assignments, give presentations and answer examination questions well (Abdul Jalil, 2014, Kapifour & Naveh, 2011). To date, little research on vocabulary learning strategies has been conducted among Malaysian ESL learners in post-secondary education (Azadeh & Ghazali, 2011; Cheang et al., 2008). Hence, this paper intended to identify vocabulary learning strategies (VLS) used by matriculation students in Malacca Matriculation College and to examine their level of use for each vocabulary learning strategies (VLS) category.

LITERATURE REVIEW

Schmitt's Taxonomy of Vocabulary Learning Strategies (VLS)

The taxonomy invented by Schmitt (1997), Schmitt's Taxonomy of Vocabulary Learning Strategies (VLS) is used as the basis for this research. The rationale behind using Schmitt's taxonomy was due to the fact that currently it is the most extensive one available with six VLS categories that are clearly defined and easy to work with (Docqzi, 2011). Moreover, it is one of the most preferred VLS taxonomies among vocabulary teaching experts and it also has high reliability when applied in previous vocabulary-related research (Waldvogel, 2013; Mayuree, 2007). In this taxonomy, vocabulary learning strategies (VLS) consist of two main categories which are discovery strategies and consolidation strategies (Figure 1).

	Discovery	Determination-discovery strategies	
Schmitt's taxonomy of vocabulary learning strategy	strategies	Social-discovery strategies	
	Consolidation strategies	Memory-consolidation strategies	
		Social-consolidation strategies	
		Cognitive-consolidation strategies	
		Metacognitive- consolidation strategies	

Figure 1: Schmitt's Taxonomy of Vocabulary Learning Strategy (Schmitt, 1997)

Discovery strategies are strategies that are used by learners to find the meaning of new words when they encounter them for the first time. They are further divided into two smaller categories which comprise determinationdiscovery strategies and social-discovery strategies. Consolidation strategies are strategies that are used by learners to memorize, practice and retain the meaning of words that have been encountered. They are further divided into four smaller categories which consist of memory-consolidation strategies, social-consolidation strategies, cognitive-consolidation strategies and metacognitive-consolidation strategies (Gidey, 2008). These six categories of vocabulary learning strategies (VLS) are explained in detailed in the following sections. In total, there are 58 strategies under these six categories (Figures 2, 3, 4, 5, 6, 7).

Determination-Discovery Strategies

DETERMINATION-DISCOVERY STRATEGIES		
DET	Analyze part of speech	
DET	Analyze affixes and roots	
DET	Check for L1 cognate	
DET	Analyze any available pictures or gestures	
DET	Guess from textual context	
DET	Bilingual dictionary	
DET	Monolingual dictionary	
DET	Word lists	
DET	Flash cards	

Figure 2: Determination-Discovery Strategies (Schmitt, 1997)

Determination-Discovery strategies are vocabulary learning strategies (VLS) that help learners to identify the meaning of new words without others' help (Waldvogel, 2013). Out of the fifty-eight items in the Schmitt's Taxonomy of Vocabulary Learning Strategies (1997), nine strategies belong to this category (Figure 2). The strategies are analysing parts of speech, analysing affixes and roots, checking for L1 cognate, analysing any available pictures or gestures, guessing from textual context, using bilingual dictionary, monolingual dictionary, word lists and flash cards.

Social-Discovery Strategies

SOCIAL-E	DISCOVERY STRATEGIES
SOC A	Ask teacher for L1 translation of the new word
SOC A	Ask teacher for paraphrase or synonym of the new word
SOC A	Ask teacher for an example of sentence that includes the new word
SOC A	Ask classmates for meaning of the new word
SOC E	Discover meaning of the new word through group work activity

Figure 3: Social-Discovery Strategies (Schmitt, 1997)

Social-Discovery strategies are vocabulary learning strategies (VLS) that help learners to identify the meaning of new words through interaction with others. Out of the fifty-eight strategies in Schmitt's Taxonomy of Vocabulary Learning Strategies (1997), five strategies belong to this

category (Figure 3). The strategies are asking a teacher for L1 translation of a new word, for paraphrase or synonym of a new word, and for an example of sentence that includes a new word, asking classmates for meaning of a new word and discovering meaning of a new word through group work activity.

Memory-Consolidation Strategies

MEMORY-CONSOLIDATION STRATEGIES			
MEM	Study word with a pictorial representation of its meaning		
MEM	Imagine word's meaning		
MEM	Connect word to a personal experience		
MEM	Associate the word with its coordinates		
MEM	Connect the word to its synonyms and antonyms		
MEM	Use semantic maps		
MEM	Use 'scales' for gradable adjectives		
MEM	Group words together to study them		
MEM	Group words together spatially on a page		
MEM	Use new words in sentences		
MEM	Group words together within a storyline		
MEM	Study the spelling of a word		
MEM	Study the sound of a word		
MEM	Say new word aloud when studying		
MEM	Imagine word form		
MEM	Underline initial letter of the word		
MEM	Configuration		
MEM	Affixes and roots (remembering)		
MEM	Part of speech (remembering)		
MEM	Paraphrase the word's meaning		
MEM	Use cognates in study		
MEM	Learn idiom together with the new word		
MEM	Use physical action when learning a word		
MEM	Use semantic feature grids		
MEM	Use Loci Method		
MEM	Use Peg Method		
MEM	Use Keyword Method		

Figure 4: Memory-Consolidation Strategies (Schmitt, 1997)

Memory-Consolidation strategies are vocabulary learning strategies (VLS) whereby learners acquire new words by associating their existing experience or background knowledge with new words through mental

images or groupings (Waldvogel, 2013). Out of the fifty-eight items in Schmitt's Taxonomy of Vocabulary Learning Strategies (1997), twenty-seven strategies belong to this category (Figure 4). Some example of the strategies are studying word with a pictorial representation of its meaning, using imagination to remember the meaning of a new word, connecting a word to a personal experience, connecting a word to its synonyms and antonyms, using semantic maps and using physical actions when learning a new word.

Social-Consolidation Strategies

SOCIAL-CONSOLIDATION STRATEGIES			
SOC	Study and practice meaning of a new word in a group		
SOC	Teacher checks students' flash cards or word lists for accuracy		
SOC	Interact with native-speakers		

Figure 5: Social-Consolidation Strategies (Schmitt, 1997)

Social-Consolidation strategies are vocabulary learning strategies (VLS) used to retain information and meaning of new words through interaction with others (Azadeh & Ghazali, 2011). Out of the fifty-eight items in the Schmitt's Taxonomy of Vocabulary Learning Strategies (1997), three strategies belong to this category (Figure 5). The strategies are studying and practicing meaning of a new word in a group, asking a teacher to check students' flash cards or word lists for accuracy and interacting with native-speakers.

Cognitive-Consolidation Strategies

COGNITIVE-CONSOLIDATION STRATEGIES		
COG	Verbal repetition	
COG	Written repetition	
COG	Word lists	
COG	Flash cards	
COG	Take notes in class	
COG	Use the vocabulary section in your textbook	
COG	Listen to tape of word lists	
COG	Put English labels on physical objects	
COG	Keep a vocabulary notebook	

Figure 6: Cognitive-Consolidation Strategies (Schmitt, 1997)

Cognitive-Consolidation strategies are vocabulary learning strategies (VLS) that do not engage learners in mental processing but instead use repetition and mechanical means such as word lists, flash cards, and vocabulary notebooks to study words. Out of the fifty-eight strategies in Schmitt's Taxonomy of Vocabulary Learning Strategies (1997), nine of them belong to this category (Figure 6). The strategies are: verbal repetition of a new word, written repetition of a new word, using word lists, using flash cards, taking vocabulary notes in class, using the vocabulary section in a textbook, listening to a tape of word list, putting English labels on physical objects and keeping a vocabulary notebook.

Metacognitive-Consolidation Strategies

MET Les English lenguese modie (sense movies neurosets etc.)
MET Use spaced word practice MET Skip or pass new word MET Continue to study word over time

Figure 7: Metacognitive-Consolidation Strategies

Metacognitive-Consolidation strategies are vocabulary learning strategies (VLS) related to processes involved in monitoring, decisionmaking, and evaluating one's progress in vocabulary. Out of the fiftyeight strategies in Schmitt's Taxonomy of Vocabulary Learning Strategies (1997), five of them belong to this category (Figure 7). The strategies are using English-language media such as songs and movies to enhance vocabulary, testing oneself with words tests, using spaced word practice, skipping or passing the new word and continuing to study word over time by having a personal schedule to learn English vocabulary.

Vocabulary Learning Strategies Use among ESL and EFL Learners

Both EFL and ESL students at various levels of education depict both discovery and consolidation strategies although these strategies may vary. Wu (2005) investigated the vocabulary learning strategies used by

Taiwanese EFL secondary and English major university students. The results revealed that the three most frequently discovery strategies used by students in learning English vocabulary were using bilingual dictionaries to find out Chinese translations of English words, guessing from textual context and asking classmates for the meaning of words. The former two belong to the determination-discovery category, while the latter belongs to the social-discovery category. As for consolidation strategies, studying the sound of a word and repeating a word's form under memorizationconsolidation category were the two most frequently used strategies by the students. Similarly, Docqzi (2011) explored the vocabulary learning strategies of 84 Hungarian final year high school and university students. The findings showed that two strategies: guessing from textual context and using monolingual dictionary in determination-discovery categories were the most frequently used strategies. Meanwhile, other vocabulary learning strategies such as interacting with native speakers and practicing words on a regular basis under social-consolidation category and metacognitiveconsolidation category respectively were less frequently used by the students. The research also indicated that the number of vocabulary learning strategies used by the students increased with the time they spent studying the language. Meanwhile, Azadeh and Ghazali (2011) examined the type of vocabulary learning strategies used by Malaysian ESL university students majoring in Teaching English as a Second Language (TESL). The findings showed that determination-discovery, metacognitive-consolidation and memory-consolidation as the three most frequently used vocabulary learning strategies (VLS) categories. The students were keen in using the following vocabulary learning strategies: guessing from textual context, using monolingual dictionary, using various English language media, and applying new English words in their daily conversation. Next, El-Ghouati (2014) looked into Vocabulary Learning Strategies among 60 Master students from the English Department in a university in Meknes. The findings revealed that the three categories of vocabulary learning strategies the students most frequently used were determination-discovery strategies, memory-consolidation strategies and cognitive-consolidation strategies.

Benefits of Vocabulary Learning Strategies (VLS)

Vocabulary learning strategies contribute to better reading comprehension skill and bigger vocabulary size to ESL and EFL learners.

To illustrate, Kapifour and Naveh (2011) investigated the use of vocabulary learning strategies and their contribution to reading comprehension among 164 EFL undergraduate students in Kerman Province. The results showed that the EFL undergraduate students were medium strategy users who used metacognitive strategies most frequently and social strategies least frequently. The results also indicated that the use of social-discovery and social-consolidation strategies contributed to the students' reading comprehension.

Meanwhile, Muhd Sahandri, Reza and Saifudin (2009) looked into vocabulary learning strategies and their relation to vocabulary size among 125 Iranian undergraduate students majoring in TEFL. The findings revealed that Iranian EFL learners were medium users of VLS and vocabulary learning strategies contributed to their vocabulary size. However, only nine out of 41 vocabulary learning strategies showed significant relation to vocabulary size. The strategies were using physical action when learning a word, interacting with native speakers, taking notes or highlighting, studying new words many times, using a bilingual dictionary, using English language media, studying the word with classmates, studying the sound of a word, and repeating the word verbally.

Panjaitan and Gintings (2012) conducted a classroom action research on improving students' vocabulary achievement by using personal vocabulary notes which is a cognitive-consolidation strategy under Schmitt's Taxonomy of Vocabulary Learning Strategies. The subjects were 46 secondary school students. The methods used for this research were diary notes, observation sheet, and questionnaire. The research was conducted in two cycles and each cycle consisted of three meetings. The result showed improvements in the students' scores from the first test in orientation test to the third test in cycle-II test in which the mean for the first test was 46.95, the mean for the second test was 64.86, and the mean for the third test improved to 80.45. This showed that the use of personal vocabulary notes significantly improved students' vocabulary.

Shek (2007) also looked into vocabulary learning strategies and vocabulary size. He compared English as a medium of instruction(EMI), Chinese as a medium of instruction(CMI) and partial EMI (PEMI) Secondary Six students in Hong Kong. The results revealed that the

EMI students were the most proficient group in terms of vocabulary size and word knowledge followed by CMI and PEMI students. In terms of discovery strategies, the vocabulary learning strategy that was frequently used by the CMI and PEMI students was the use of dictionary, whereas guessing from context was identified as the most frequently used strategy by the EMI group when they encountered new words. For consolidation strategy, both the CMI and PEMI students often studied the sound of words while the EMI students frequently studied the spelling the words to consolidate the meanings. The study also indicated that the overall means of the EMI and PEMI students' ratings for perception of strategies were statistically higher than that of the CMI students. They (EMI and PEMI students) had a more positive attitude towards the usefulness of vocabulary learning strategies. Furthermore, a positive and significant relationship between the frequency of use and the perceived usefulness of vocabulary learning strategies was established among the three groups of students. This suggests that the more the learners perceive that a particular strategy is useful, the more frequently they will use it and subsequently, contribute to better vocabulary knowledge and bigger vocabulary size.

METHODOLOGY

The sample for this study was 140 second semester students from the Malacca Matriculation College students who were randomly chosen from four science classes and three accountancy classes. Data was collected using questionnaire adapted from VLS questionnaire by Docqzi (2011) that was modelled after Schmitt's Taxonomy of Vocabulary Learning Strategies. This questionnaire consisted of a total of 40 items (demographic data and vocabulary learning strategies). The method of response was a 5-point Likert scale whereby 1 indicated "Strongly Disagree", 2 indicated "Disagree", 3 indicated "Neutral", 4 indicated "Agree" and 5 indicated "Strongly Agree". Statistical Package for the Social Sciences software (SPSS version 20) was used to anlyse data and findings were reported using descriptive and inferential statistics.

FINDINGS AND DISCUSSION

Types of Vocabulary Learning Strategies

Table 1: Frequency of Determination-Discovery Strategies used by ESL Matriculation Students.

Items	Mean	Std. Deviation
I guess the meaning of a new word from the context when I read.	3.87	.896
I use an English-Malay dictionary to find out the meaning of new words.	3.84	.984
I use an English-English dictionary to find out the meaning of new words.	3.59	1.079
I identify parts of speech of a new word to find out the meaning.	3.31	.922
I identify affixes and roots of a new word to find out the meaning.	3.10	.900

(Scale:1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree)

As shown in Table 1, among all Determination-Discovery strategies, the students most frequently used the strategy of guessing the meaning of a new word from the context when they read (mean=3.87, SD= .896). The second and third frequently used strategies in this category were using an English-Malay dictionary to find out the meaning of new words (mean=3.84, SD= .984) and using an English-English dictionary to find out the meaning of new words (mean=3.59, SD=1.079) respectively. Meanwhile, identifying parts of speech of new words to find out the meaning (mean=3.31, SD= .922) and identifying affixes and roots of new words to find out the meaning (mean=3.10, SD= .900) were fourth and fifth respectively in the frequency of determination-discovery strategies used by ESL matriculation students.

Guessing meaning from textual context was the most frequently used strategy among ESL matriculation students. This is supported by findings of other studies such as Azadeh and Ghazali (2011) and Gidey

(2008). One possible explanation for this finding is the influence of the experience of the ESL students in learning English in secondary schools. This is because in Malaysia, second language learning that takes place in classrooms during secondary schools is mostly reading-based (Azadeh & Ghazali, 2011). Consequently, when ESL students undergo the transition from secondary schools to matriculation colleges, they tend to fall back on this strategy whenever they encounter new unfamiliar words.

Meanwhile, the usage of bilingual and monolingual dictionaries to find the meaning of new words were respectively the second and third frequently used Determination-Discovery strategies. This is probably because they are easily available and can also be attributed to the influence of English teachers who encourage students to refer to dictionaries whenever they encounter unknown words. Moreover, as the sample of this research consisted of more Malay students (71.4%), they preferred using the bilingual English-Malay dictionary over monolingual English-English dictionary. Identifying parts of speech in order to find the meaning of new words was the fourth frequently used Determination-Discovery strategy. ESL matriculation students prefer this strategy less perhaps because they find it difficult to identify parts of speech of newly encountered words. As for identifying affixes and roots of new words in order to find their meaning, it was the least frequently used Determination-Discovery strategy as the majority of the ESL students may be unaware of this strategy. Another possible reason is that students feel that differentiating a root from its prefix and suffix is confusing for them (Gidey, 2008).

Items	Mean	Std. Deviation
I ask classmates to explain the meaning of new words.	3.23	1.006
I ask teachers for L1 translation of a new word.	3.11	.874
I work in groups to discover meaning of new words.	2.76	1.092

 Table 2: Frequency of Social-discovery Strategies Used by ESL

 Matriculation Students

(Scale: 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree)

The strategy of asking classmates to explain the meaning of new words (mean=3.23, SD=1.006) was the most frequently used strategy in social-discovery category among ESL matriculation students (Table 2). The second frequently used social-discovery strategies by the students was asking teachers for L1 translation of a new word (mean=3.11, SD=.874) and the least used strategy was working in groups to find out the meaning of new words (mean=2.76, SD=1.092).

One possible reason for this finding on classmates is the students feel more comfortable in asking for help from their classmates who are there (Elias, 2014). This is because the students usually are more open when interacting with their peers and they share a similar discourse with one another which allows for greater understanding between them (Briggs, 2013). As for getting help from teachers, ESL students tend to ask teachers for L1 translation of the words that they do not know as they regard teachers as mediators for both languages (Gibbons, 2003). In contrast, working in groups to discover the meaning of new words is least preferred probably because a study group only works if everyone does their part (Taylor, 2013). Moreover, it requires continuous cooperation, discipline and motivation from all the group members to maintain it as well as it is time-consuming.

Items	Mean	Std. Deviation
I study the spelling of new words.	3.70	.950
I connect the words with personal experience.	3.61	.902
I say new words aloud when I first encounter them.	3.60	1.130
I use new words in sentences and in conversation, so I can remember them.	3.54	1.013
I create a mental image of a word's meaning/ imagining the word's meaning.	3.40	.995

 Table 3: Frequency of Memory-consolidation Strategies Used by ESL

 Matriculation Students

I remember a new word by remembering its location on a page, on a board or a street sign where I first saw or heard it.	3.30	1.142
I use physical actions when learning to remember new words.	3.30	1.037
I write new words down together with its pronunciation.	3.26	.985
I group words according to their synonyms and antonyms.	2.99	1.025
I use semantic maps to remember new English words.	2.99	.996

(Scale: 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree)

Table 3 indicates that out of all strategies in memory-consolidation category, the ESL matriculation students most frequently applied the strategy of studying the spelling of new words (mean=3.70, SD= .950). The second and third frequently applied strategies were connecting words with personal experience (mean=3.61, SD= .902) and saying new words aloud when they first encountered it (mean=3.60, SD=1.130) respectively. Meanwhile, using new words in sentences and conversation (mean=3.54, SD=1.013) and creating a mental image of a word's meaning (mean=3.40, SD= .995) were the fourth and fifth frequently used memory-consolidation strategy among the students respectively. Grouping words together according to its synonyms and antonyms (mean=2.99, SD=1.025) and using semantic maps (mean=2.99, SD= .996) were tied as the least frequently used memory-consolidation strategies among ESL matriculation students.

Studying the spelling of new words was the most frequently used strategy among Memory-Consolidation Strategies. The students may have realized that it is quite difficult to spell out the correct spellings of many English words due to the strong influence of L1 sound system and morphology; thus, they put more effort in learning spelling of second language vocabulary (Gidey, 2008). As for the other frequently used Memory-Consolidation strategies such as connecting words with personal experience, saying new words aloud when encountering them for the first time, etc., the students may have used these strategies as they were familiar with them as well as they were easy and practical to use. Meanwhile,

the strategies of grouping words according to synonyms and antonyms and using semantic maps were the least frequently used strategies. This could be because students rarely keep tab of newly acquired vocabulary in this manner as it takes time to group words and to draw semantic maps (Regier, Khetarpal & Asifa, 2013).

Items	Mean	Std. Deviation
I interact with fluent speakers.	3.14	1.008
I study and practice the meaning of new words in a group.	2.84	1.081

Table 4: Frequency of Social-consolidation Strategies Used by ESL Matriculation Students

(Scale: 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree)

Based on Table 4, for social-consolidation category, the strategy of interacting with fluent speakers was more frequently used by ESL matriculation students (mean=3.14, SD=1.008) in contrast to studying and practicing meaning of new words in a group (mean=2.84, SD=1.081). This can be linked to the appeal of communicating with others in the second language and the opportunity to practice using new words that they learn during conversations. Moreover, through the interaction, students may gain a boost in their self-confidence regarding their second language oral skill (Ramírez, 2010). In contrast, practicing meaning of new words in a group strategy is least preferred as it requires consistent commitment from the members in order for the strategy to succeed (Taylor, 2013).

 Table 5: Frequency of Cognitive-consolidation Strategies Used by ESL

 Matriculation Students.

Items	Mean	Std. Deviation
I say a new English word several times.	3.70	.887
I use word lists to study and remember words.	3.44	1.081
I write a new English word several times.	3.40	.888

I take vocabulary notes in class.	3.20	.938
I use the vocabulary section (glossary) in books and modules.	3.09	.877
I use flashcards to study and remember words	2.71	1.075

(Scale: 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree)

Table 5 shows that saying a new word several times (mean=3.70, SD=.887) was the most frequently used strategy by ESL matriculation students for cognitive-consolidation category. The second and third frequently used cognitive-consolidation strategies were using word lists to study and remember words (mean=3.44, SD=1.081) and writing a new word several times (mean=3.40, SD=.888) respectively. These were followed in descending frequency of use among the students of three other cognitive-consolidation strategies: taking vocabulary notes in class (mean=3.20, SD=.938), using the glossary in books and modules (mean=3.09, SD=.877) and using flashcards (mean=2.71, SD=1.075).

The ESL matriculation students often used verbal repetition of English words. This could be because the students believe that by continuously saying the new words, eventually they will be embedded in their long-term memory and can be retrieved to be used in communication in future (Lip, 2009). Next, using word lists to study and remember words was often used due to its comprehensiveness in listing important words that should be learned by ESL students according to the students' specific language proficiency. Besides, sometimes the word listed were already categorized into certain categories such as feelings, animals and food which helped students to learn them better. Meanwhile, vocabulary notes in class were less often used by ESL matriculation students possibly because they involved more time and effort (Roberts, 2012). As for the strategy of using flashcards, it was least used by the students. The reasons are that they are expensive and even if the students produce it on their own, they may take quite a long time to be completed (Siti Inayah, 2010).

Table 6: Frequency of Metacognitive-consolidation Strategies Used by ESL
Matriculation Students

Items	Mean	Std. Deviation
I listen to English songs and watch English television programs to develop my English vocabulary knowledge.	4.31	.968
I read books, magazines and newspapers to develop my English vocabulary knowledge.	4.11	.919
I test myself with vocabulary test.	3.06	1.044
I plan my schedule, so I will have enough time to study vocabulary.	2.80	1.120

(Scale: 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree)

As shown in Table 6, for the metacognitive-consolidation category, ESL matriculation students most frequently used the strategy of listening to English songs and watching English television programs to develop their English vocabulary knowledge (mean=4.31, SD= .968). This was followed by reading books, magazines and newspapers (mean=4.11, SD= .919) and testing themselves with vocabulary tests (mean=3.06, SD=1.044) which were the second and third frequently used metacognitive-consolidation strategies respectively. Meanwhile, planning schedule to have enough time to study vocabulary (mean=2.80, SD=1.120) was the least frequently used metacognitive-consolidation strategy among ESL matriculation students.

The frequently used strategies of listening to English songs and watching English television programmes or movies can be linked to the fact that the students were able to enjoy themselves and at the same time, learn new vocabulary. Besides, these authentic materials are good in promoting learning new words in their contexts (Azadeh & Ghazali, 2011). Other possible explanation for its frequency of use by the ESL students is perhaps due to easy accessibility of the materials as technology currently is a major tool in second language teaching and learning process (Nomass, 2013). Testing with vocabulary test was less preferred by the ESL students and this may be because they found it a rigid way to learn vocabulary. Meanwhile, the strategy of allocating specific schedule for

vocabulary learning ranked last among the metacognitive-consolidation strategies. This can be because the majority of the ESL students prefer discovering and learning new vocabulary incidentally rather than learning it in a planned manner (Diamond & Gluthon, 2006).

LEVEL OF USE OF VOCABULARY LEARNING STRATEGIES (VLS) CATEGORIES

VLS category	Mean	Std. Deviation	Level of strategy use
Metacognitive-Consolidation	3.57	1.207	High
Determination-Discovery	3.54	1.002	High
Memory-Consolidation	3.37	1.044	Medium
Cognitive Consolidation	3.26	1.008	Medium
Social-Discovery	3.03	1.013	Medium
Social-Consolidation	2.99	1.054	Medium

Table 7: Level of Use of Vocabulary Learning Strategies (VLS) Categories

(Scale: 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree)

Table 7 shows that among the six VLS categories, the highest frequently used VLS category by ESL matriculation students was metacognitive-consolidation strategies (mean=3.57, SD=1.207). This VLS category was classified under high level of use. This finding is supported by similar findings of other studies such as Cenghizana (2011) and Kapifour and Naveh (2011). The high usage of Metacognitive-Consolidation strategies shows that most ESL matriculation students take control of their own vocabulary learning. One reason for this finding may be due to the existence of an extensive number of easily accessible English language media such as songs, movies and television programme that enables students to discover more new words (Kapifour & Naveh, 2011). Moreover, there are various websites, blogs and other electronic resources that provide free vocabulary exercises and tests which enable learners to self-evaluate their progress in vocabulary learning. Once

students become cognizant of how much vocabulary they have learned, they are able to alter or enhance their current style of learning vocabulary by implementing more vocabulary learning strategies to assist them in improving their vocabulary (Bandpay, 2013).

Meanwhile, the second highest frequently used VLS category was determination-discovery strategies (mean=3.54, SD=1.002). This VLS category was also classified under high level of use. This finding is supported by Cenghizana (2011). One of the reasons why ESL students use these strategies is that they may be familiar with these strategies. For example, the strategy of guessing the meaning of new words based on textual context (Table 1) is most frequently used by the ESL matriculation students. This is because they probably apply it during their English language examinations and classroom activities which are mostly reading-based in secondary schools (Hiew, 2012). Meanwhile, the strategy of using bilingual and monolingual dictionaries are also frequently used by the ESL students as they are frequently encouraged by their English teachers to refer to dictionaries upon encountering unfamiliar words (Hiew, 2012).

Meanwhile, Memory-Consolidation Strategies were at a medium level of use among ESL matriculation students (mean=3.37, SD=1.044). The finding matches that of Thavornporn (2012). The reason why Memory-Consolidation Strategies are applied by ESL matriculation students is probably because they are already familiar with teacher-centered learning, rote memorizing and "spoon-feeding" during secondary schools in Malaysia (Anis, Mahani, Latisha, & Surina, 2009)

This is followed by Cognitive-Consolidation strategies (mean=3.26, SD=1.008) which were also at a medium level of use. This finding matches the research findings of Muhd Sahandri, Reza and Saifudin (2009). The reason why students apply less Cognitive-Consolidation Strategies is perhaps because they do not like the dull and tedious actions of verbal and written repetition and using glossaries to find the meaning of words (Roberts, 2012).

As for Social-Discovery Strategies (mean=3.03, SD=1.013) and Social-Consolidation Strategies (mean=2.99, SD=1.054), they were also at a medium level of use. They were the lesser used VLS strategies

ranked at fifth and sixth places in terms of level of use among ESL matriculation students. These findings correspond to the findings of other studies such as Kapifour and Naveh (2011) and Mohd Sahandri, Reza and Saifudin (2009). One reason why they are infrequently utilized by ESL matriculation students can be because the students do not want to be dependent on other people in learning vocabulary. Furthermore, teacher-controlled and presentational-style teaching in Malaysian schools promote students' passivity which counters the socio-cultural conditions that are conducive to help-seeking (Schwalb & Sukemune, 1998).

CONCLUSION

Metacognitive-consolidation strategies and determination-discovery strategies were used frequently by the students while learning English. This was probably due to the abundance of simple and practical strategies under these two VLS categories. As for the remaining four strategies: memory-consolidation strategies, cognitive-consolidation strategies, social-discovery strategies and social-consolidation strategies, they were classified under medium level of use. This study on vocabulary learning strategies has pedagogical implications. First, it enables teachers to realize their learners' needs and interest in learning vocabulary. Teachers can incorporate vocabulary learning strategies (VLS) that are less frequently used by students in the classroom. This can be done by designing tasks related to vocabulary learning strategies and giving relevant assignments that require students to apply these strategies in order to accomplish them. Subsequently, through this exposure, it could create more awareness among the students about the diverse vocabulary learning strategies as well as encourage them to apply these strategies to enrich their vocabulary.

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E-mail : ajue09@yahoo.com



