

The key elements which have influenced faculty member's
use of educational technology in higher education with
particular reference to Sultan Qaboos University, Oman

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Abstract:

The purpose of this study is to identify, confirm and illustrate the key elements that have influenced faculty member's understanding towards the use of Educational Technology (ET) in their teaching at Sultan Qaboos University. It synthesizes a model that seeks to account for these elements thereby relating educational theory to practical and purposeful use of ET. The study employed an interpretative paradigm incorporating both qualitative and quantitative methods for generating, analyzing and interpreting data.

Findings identified five key elements concerning university lecturer's use of ET. They reveal the influences upon faculty members understanding and attitudes towards how they use and value ET in their teaching. These elements were refined several times and subsequently tested against the data. Also, these elements tend to reflect the way in which there is broad agreement concerning their understanding and attitudes towards the use of ET in a Middle East university which prides itself in its international approach to Higher Education. Thus, faculty member's perception of the value and effectiveness of ET was the most influential element determining their attitudes, which, in turn encouraged them to use ET in teaching with skill and developing professionalism.

Introduction

Increasingly, rapid changes in the development of education and communication technology are a constant feature of contemporary life today. It is within this context that the application of ET to support and enhance learning and teaching in education in general, and higher education in particular, has significantly increased both in volume and complexity. Higher education institutions around the world share a common need to achieve their mission as effective and efficient places of learning and instruction in realising the potential inherent in the use of educational media and technology.

As part of its mission to provide a rich environment for teaching and learning, as well as enhancing the use of educational technology among faculty members, Sultan Qaboos University established a special Centre for Educational Technology (CET). The Centre is equipped with up to date facilities to assist academic staff in improving the effectiveness and efficiency of the learning and teaching process through the application of learning theory, research in the design of teaching and learning systems, and through the utilisation of a range of technology-based media.

Recently, the Centre established a new Multimedia Department. This Department is established to bring a new way of presenting information, in which faculty members would no longer be restricted to text or graphic materials to present their ideas. They can also use Clip Art, full colour image, video clips, sounds, music and narration. In addition, this department also produces Web pages for the Internet, general informative CD, CBT (Computer Based Training), interactive packages and a wide range of comprehensive presentations, (<http://www.squ.edu.om/cet/index.html>). While

technology is used pervasively in administration and research, this is not always the case for instruction, teaching and learning. This pattern of the use of ET is discernible in contemporary teaching culture in Oman Higher Education.

It is the case that many lecturers adhere to traditional teaching methods, which, typically means that they make minimal use of ET. This study seeks to probe the attitudes of lecturers towards ET, including making reference to their reluctance to change their practice. Importantly, this paper indicates the enhanced power and value of ET once lecturers use their understanding of teaching and learning theories to shape and enhance their application of ET. It is in these ways that they can optimize their use of ET in their teaching

Thus, this study is derived from a professional need to understand how lecturers might confidently use educational technologies. It comes from a realization that trainers and developers can work towards a better understanding of lecturer's approaches to using ET. Thus, this study describes the growth, changes and significance of acquired understanding of ET in its various classroom related applications in a Middle Eastern university context.

Vitaly, the study also demonstrates how faculty members can enhance the effectiveness of their teaching and crucially, their students' learning. This is seen to be achieved through using ET, based upon personal, confident understanding of its place in the total scheme of teaching and learning. By revealing faculty member's attitudes to its use the researcher has been able to recommend that the reflection upon how people might learn begins the professional process of enabling teachers to adopt the most

appropriate form of ET. A rational approach to the salient issues is adopted in the context of this empirical study.

The Elements of the Study Models

The study model considers five key elements, which should be considered together and allowed for when applying any sort of technology in education, particularly, in higher education. These elements are not necessarily similar in every learning environment. There is also no consensus among scholars and researchers, as to which might determine which elements are adopted. For instance, *Rogers (1995)* suggested five elements which include the learner, faculty member, technology, environment and perceived value.

Further, *Spotts (1999)* indicated the importance of faculty members' technological knowledge and experience, the receptivity of the learner, the availability of resources, the technical support and the compatibility of technology with subject matter. Whereas, *Harris (1999)*, in his structural equation model hypothesis outlined five variables which influence user attitudes, namely; task characteristics (task variety-task uncertainty), product involvement, computer anxiety, personality (risk-taking- carefulness-dependence- autonomy) and organisational culture.

However, all scholars and researchers tend to agree that these elements are not the only influences to be considered and also that technology cannot, and will not, replace the teacher.

This research draws upon a wide variety of approaches to studying educational technology in various educational settings. It therefore, proposes to study the following key elements which exemplify the essential principles in understanding the use of educational technologies in teaching and learning, especially those

which influence faculty members at Sultan Qaboos University in their attitudes to the use of educational technology. These relate to the following key issues which developed from data bank, my experience and the literature.

Teaching and Learning Theories: The literature review revealed that there is a relationship between different theories of learning and teaching and the use of education technology. It can be noticed, firstly, that the design of technology even if it was not invented by educators and psychologists, is influenced by the theory of behaviorism, (Bates, 1995). Secondly, the applications of new technologies such as word-processor, PowerPoint, spreadsheet and other appliances and software allow educators opportunities to understand how these applications can help the learners to process information, as well as to engage in abstract thinking, and to make the knowledge construction process clear and transparent, (Pachler, 1999).

Sadera & Hargrave (1998) stated that computers in education are part of a wider context in which they exist. It is important to consider the relationship between dominant instructional theory and the wider information technology context to ensure that computers are used to the best effect. Therefore, this element of the model assumes that the greater the familiarity of faculty members with different theories of learning and teaching, the more likely they will be, to use educational technology properly and effectively.

Good understanding of learning and teaching theories is shown to affect how people teach and use educational technology. This study revealed the importance of this principle in teaching. It demonstrated how this approach helped faculty members to use

educational technology effectively. It established that the more familiar a lecturer is with learning theory the more likely they are to use ET well in their teaching.

Knowledge and Experience of the User:

Further, the literature review in this issue indicated that faculty members' knowledge of the capabilities of each medium and technology, its appropriateness to the learning situation and the subject matter, an understanding of the place of technology in teaching and learning, and experience in using different types of technology are all likely to foster positive attitudes towards its use, (*Sadera & Hargrave, 1998.*)

These views support *Ely (1999)* evidence that knowledge and skills required by the ultimate user, are the most important element leading to the implementation and adoption of educational technology.

Further, since technological knowledge is increasing so rapidly, then, according to *Reid (2000)*,

“ knowledge must be constantly be required in order to understand technology and solve the problems of the time ”.

<http://scholar.lib.vt.edu/ejournals/JTE/v11n2/reid.html>

Simply, the more knowledgeable and experienced the users become, the more likely they are to use educational technology in the classroom.

Resources, Technical Support and Training for the User:

The literature review on the availability of learning resources, technical support and training provide the evidence that

these elements are vitally important in encouraging faculty members to adopt and use ET in learning and teaching process, (Ely,1999). It also indicated that if the need for learning resources and technical support continues to grow, the need for training of all kinds will increase, (*Padron (1996)*). The literature review on this issue demonstrated that the lack of training often resulted in high anxiety about educational technology use in classroom,(*Sadera & Hargrave (1998)*, (*Steven & Lonberger, 1998*).

Lack of training is also one of the biggest barriers in the use of technology in education. Thus, the more learning resources, technical support and training are available in the university the more faculty members adopt ET and use it in classroom.

Organisational Culture and Working Environment:

This element directly or indirectly affects the user. It can be noticed from the literature review that the organisational culture and working environment do affect its members' decision whether to use or not to use technology, ((*Brown, 1998*, , *Harris, 1999*). This is due to the fact that the diversity of the organisational members' culture, procedures, instructions, and promotion policies, (which may or may not acknowledged time spent on educational innovation) are all likely to influence faculty members' decision on the use of ET in the classroom, (*Anderson & et al (1998, Spotts, 1999)*

Perceived Value of Technology by the User:

This is also a very influential element, which might or might not encourage faculty members to use technology. Unless faculty members see a practical benefit from using educational technology, for example, through enhancing' students learning, making ideas

accessible, comprehensible and clear, saving teaching time, aiding interaction and participation between faculty members and their students, they will be less likely to use it, (Mapp, 1996, Zhao & Rop, 1998, Spotts, (1999).

This suggested model will be tested to confirm and illustrate its elements and will also be revised according to the result of the data analysis, with respect to my understanding of the impact of educational technology in higher education teaching and learning.

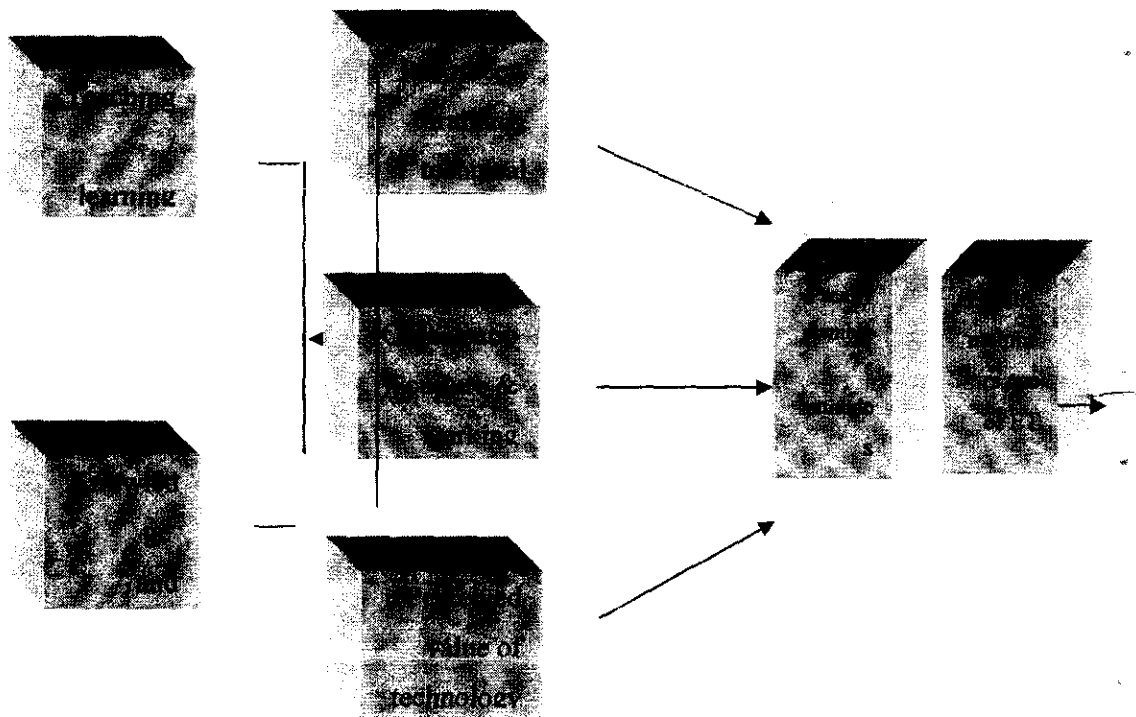


Figure 1: Suggested Study Model

Methods :

An inductive interpretative analysis process is used in this study to frame the results as empirical elements determining the essential knowledge and attitudes underlying the faculty members' understandings of ET in their teaching and learning processes.

Six faculty members at Sultan Qaboos University were interviewed to discover the extent to which they understand the value of educational technology in teaching and learning processes. Information will be sought concerning how thoughtful these faculty members are in using ET, so as to reveal the influential elements behind their use, understanding and attitudes. The sample of six professional faculty members included two who declared that they constantly used ET in their teaching.

The first respondent who used ET in his teaching was an Omani national employed as a faculty member in the department of Biology in the College of Science. He has taught for approximately six years. He is thirty-nine years old. He gained his BS, MS, and Ph.D. from Universities in the USA. His rank in the University is that of Assistant Professor. He was contacted by telephone and readily agreed to be interviewed as part of the research. He was known to the researcher as a colleague. Because of his extensive teaching experience in the USA he was sympathetic to the use of ET and subsequently uses it extensively in his teaching, especially the Multimedia system which he installed in one of the College's Laboratory.

The second respondent who uses ET constantly is also an Omani national employed as a faculty member in the department of educational administration in the College of Education. She has

taught for approximately ten years. She is forty-seven years old and her BA and MA were obtained from Universities in Bahrain and her Ph.D. was from a University in Lebanon. Her rank in the university was Assistant Professor and she was Assistant Dean for scientific research but now she is an Associate Professor. The researcher visited her office whereby she agreed to be interviewed as part of the research.

Two other faculty members stated that they did not use ET at all in their teaching. The first respondent in this regard is an Omani national employed as faculty member in the department of Sociology Science in the College of Arts and Social Science. He has taught for approximately three years. He is forty-nine years old and his BA and MA were obtained from Universities in the USA and his Ph.D. was studied in the UK. His rank in the University is a lecturer. The researcher visited his office and he agreed to be interviewed as part of the research. The second one who does not use ET at all in his teaching is also an Omani national employed as Assistant Professor in the department of history in the College of Arts and Social Science. He has taught for approximately 7 years. He is fifty-five years old and his BA, MA and Ph.D. are all from Egyptian Universities. His rank in the University is Assistant Professor. The researcher visited him and he agreed to be part of the research.

Finally, there were two other faculty members whose use and experience of ET were not known to the researcher. The first respondent is a Sudani national employed as a faculty member in the department of Curriculum, teaching methods and Educational Technology in the College of Education. He has taught for approximately 8 years. He is forty-six years old and his BA and MA were obtained from Sudan and his Ph.D. was from America. His

rank in the University is Assistant Professor. The researcher visited him and he agreed to be part of the research. The second one is an Egyptian employed as a faculty member in the College of Education in the department of Curriculum, Teaching Methods and Educational Technology where she has taught Chemistry for approximately 9 years. She is forty-two years old and her BA and MA were obtained from Egypt and her Ph.D. was from a University in the UK. The researcher phoned her and she readily agreed to be part of the research. All the respondents were experienced lecturers in University teaching and expert in their field.

Result :

The data collected from the interviewee responses was categorized in order to clarify its interpretation and analysis. The faculty members' understanding of ET is revealed through elements which were subsequently broken down into categories and classifications in order to illustrate the elements of the study model. Additionally, evidence of each element, category and classification from the interviewees were translated from Arabic into English.

Five key elements have been identified and formulated according to the study model and with regard to the faculty members' responses to the interview questions. Further, these key elements were set out in order to reflect the way in which faculty members tend to agree more on the issues with element one through to element five which addresses diverse issues concerning attitudes towards the use of ET.

Element 1: Thus, the most important element, element 1, was the perceived value and effectiveness of educational technology in their teaching. Their perception of the value of ET was also the

most widely understood and appreciated area of context in ET because all the respondents made strong repeated references to it. It received high agreement and consensus among faculty members who use ET because it helps them in the following areas:

- Teaching organisation (organising the structure of their lectures and presenting complex ideas).
- Students' learning (ET helps students' concentration, attracts their attention to the subject matter, facilitate face-to-face interactions, enhances students' achievements and helps develop self-directed learning).

Element 2: The second most important element was faculty members' personal confidence, which influenced their positive attitudes towards the classroom use of ET. Faculty members demonstrated their understanding of the importance of confidence, (through numbers value of elements or components) which collectively contributed built up their confidence, including:

- Educational background
- Development and utilisation of personal acquired skills
- Ease of use and operation of ET hardware and software
- Prior experience in the use of ET
- Willingness and receptivity to work with ET
- Personal effort in preparing teaching materials.
- Lecturer awareness of the important role of technology in students' learning.

Element 3: The third salient element was faculty members' knowledge of, and experience in using, one, or more than one, type

of ET hardware and software. The knowledge and experience gained over time in teaching, and through updating skills when necessary to keep abreast of new developments in the field of ET was vital in the growth of confidence to use ET. Knowledge and experience in selecting the most appropriate technology for a given learning situation was also crucial.

Element 4: The fourth element was the effect of working in multinational and multicultural organisation on faculty members' use of ET. This element was also significant for some faculty members I interviewed, since it encouraged them to use ET in the classroom. They felt that the multinational and multicultural organisation affected their use positively in two respects, because it tended to:

- Create a competitive morale building atmosphere among faculty members to use ET
- Help them exchange information, knowledge, and experience, and to follow up the development in the technology field.

The interviewees stated that they understood the crucial effect of the working environment on the use of ET. Faculty members felt that the rules, procedures and instructions, especially those related to the use of technology in the classroom, needed to be clear and simple and, that they progressed in their skills of using ET more effectively because of receiving clear information, instruction and feedback. They also felt that the absence of these regulations had influenced some of them not to use ET because they thought it was not important to be used in teaching. Another aspect of the working environment was established university policies regarding

career progression promotion and reward for those who consistently used ET in the classroom. Faculty members thought that, this element might be somewhat influential, but they also believed that the use of ET should be considered as a vital part of their job as teachers, and not to have to seek for promotion simply to do their duties.

The availability of resources, training and technical support was also an essential element in the process of technology use. Some interviewees complained that timely support was not always available to them in the university. Further, the faculty members felt that if the university provides the resources, technical support and training, lecturers would be disposed to make effective use of technology in their teaching.

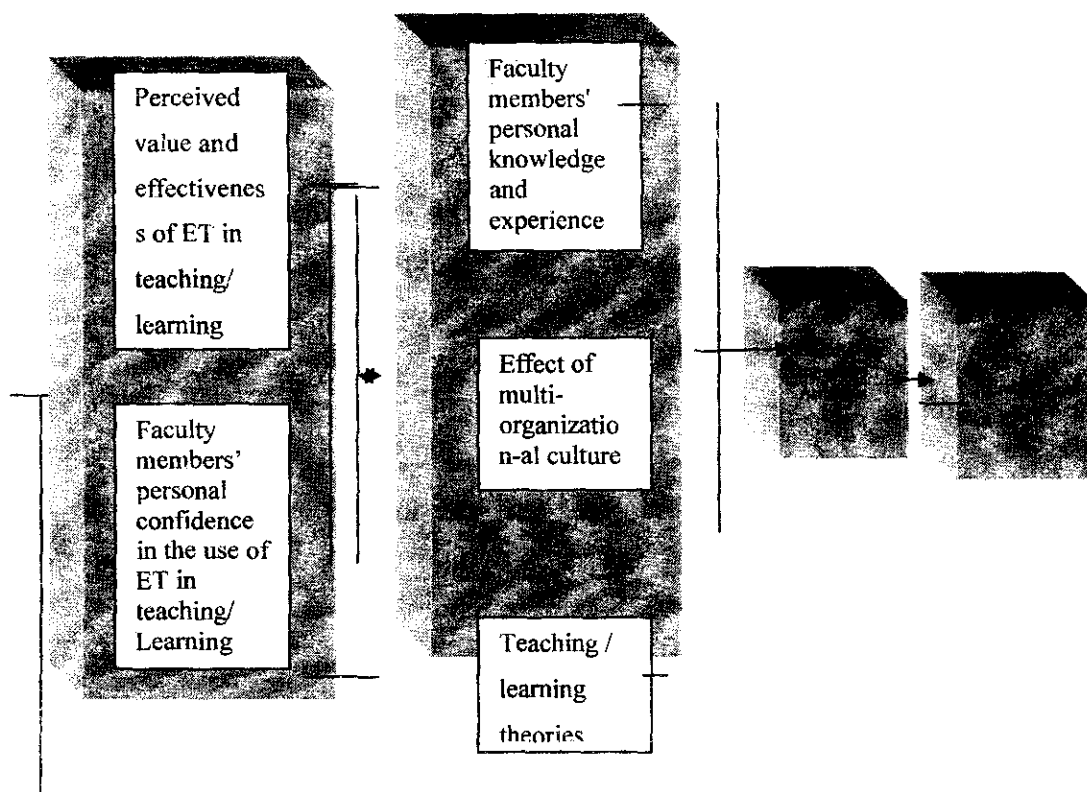
Element 5: The fifth element, elicited a variety of responses germane to current learning and teaching theories. Although this element of the model framed the expectation that a faculty member would be aware of and resort to particular learning and teaching theories when using any sort of technology, it seemed this element was not seen as important from practitioner viewpoint. Faculty member from the College of Science, who used sophisticated technologies with no background in any kind of teaching and learning theories, did not see this as a problem. In contrast, one of the faculty members from the College of Education, who was aware of and familiar with many of these theories, held the view that these theories were fundamental to informing all good teaching. A “good” teacher to him was one who used technology as an adjunct to his teaching in effecting learning.

Implications :

The study framework recognises that attitudes and subjective norms constitute major components of the Theory of Reasoned Action (TRA) influencing the actual behaviour of the user. Thus, the revised study model or Al-Hashmi Educational Technology Implementation in Higher Education Model (ETIHEM) provides evidence that the lecturers perception about the tangible value of ET in teaching and their personal confidence confirmed the significant influence of these key elements on attitudes, which in turn proved to be relatively more influential than the subjective norms on the behaviour of faculty members to use ET. However, their prior knowledge and experience; the effect of the multi-national and a multi-cultural, working environment; and their implied teaching and learning theories (the subjective norms), all of these contributed to their self-perceived social pressure in influencing teaching behaviour all had contributed to faculty members' use of ET in teaching and promoting learning. This finding has significant implication for teacher educators and educational technologists, staff developers, instructional and curriculum designers, policy maker and educational leaders in University sector who need to consider the effect of both components (attitudes and subjective norms) when implementing ET in higher education. The observed dynamics of the model which linked theory to practice provides further insight and broad understanding about the nature of educational technology use as it is applied to the Theory of Reasoned Action (TRA). As foreseen on suggested study model, this revised model is not linear in some simple sense that includes feedback and reciprocal effects of both attitudes and behaviours. But with each experience of the loop, insight understanding may be

expected to deepen. It is to be hoped that this will promote positive attitudes towards ET, and every effort of planning and management needs to be made to bring this about. However, there is nothing automatic in these procedures which require sophisticated awareness in all participant. These findings among other implications discussed, on this subject, I believe form a significant contribution to the theoretical knowledge.

Figure 2 Revised study Model



The revised model also has important implications for research and practice in the implementation and diffusion of the use of Educational Technology in higher education. In this respect, I argue that its use is likely to lead to a better understanding of elements influencing faculty members to use ET, and that it has the potential to guide and inform teaching and its cognate processes in higher education environments. While I argue that this model provides ways to understand and develop programmes to support faculty members use of Educational Technology, as a further addition to the work of *Rogers (1995)*, *Zhao & Rop (1998)*, *Spotts (1999)*, *Harris (1999)*, but now more sensitive and applicable to Arab culture. This model is therefore regarded as being directly relevant and culturally appropriate to the context in which this research took place with possible use in other cross-cultural contexts, although this requires further research going beyond the scope of the current study. It has strategy implications for staff developers that to widen the use of ET among faculty members, to probe their reluctance and to encourage them to appreciate the genuine need for the use of technology in teaching, it is vitally important to reflect on and incorporated developmentally, those elements identified by the study that have influenced faculty members' attitudes toward the use of ET, and there by to remove or ameliorate the barriers identified by them. A more complete understanding of their attitudes towards the use of ET might help to raise their awareness of its value and usefulness.

Further, the study also suggests that faculty members need to be more aware of and familiar with different learning and teaching theories in order to use ET most effectively, even if it was not an important element in their decision to use technology.

Conclusion :

There is now evidence provided from this study that as lecturers acquire and deepen their understanding of ET, their professional growth and discernment regarding professional practice becomes enlarged, refined and more focused. Used well educational technologies clearly enhance the quality and effectiveness of teaching, and, importantly, student's learning. This is especially germane when lecturers make explicit reference to the purpose of their teaching, with respect to their use of ET – a vital finding in this study.

Thus, the more a lecturer understands the value of explicit learning theories in their field of operation the more effective and positive their attitudes are likely to be concerning their employment of ET skills when teaching. The evidence provided by the data in this particular study in a Middle Eastern University illustrated that the majority of the lecturers interviewed did not make explicit to themselves the relationship between what they were teaching, the learning theories associated with the subject-matter of their lectures and their employment of ET. However, once they made clear connections between these issues confidence grew in their adoption of ET in their work. Examples, where this took place reveal clarity in teaching and learning.

Thus, the study revealed that faculty members are able to enhance their teaching with ET when they acknowledge, not just what is to be learned, but the way that particular forms of the learning are shaped and presented. They also appreciate that such actions aid their student's understanding of the subject-matter taught. Therefore, lecturer's underlying philosophy about learning processes is instrumental to their ability to use ET.

Professional understanding of the effect of ET in this regard is derived as a consequence of background, experience and training embodied in teacher's individual world view of teaching, their socio-cultural interactions, which they experience within university life, and through their natural disposition to their acquired attitudes in using ET. As has been demonstrated throughout this study inductive interpretation of certain salient elements concerning lecturer's use of ET exhibit a myriad of personal philosophies and values, all of which come to characterise an individual's prevailing attitude to ET.

From this realisation, trainers and developers can work towards a better understanding of lecturer's approaches to using ET, with respect to the wider issues concerning the validation of the many aspects of professional development enhanced through effective use of ET. This study has described the growth, changes and significance of acquired understanding of ET in its various classroom related applications in a university context.

ET can clearly enhance the effectiveness of teaching and crucially student's learning when used with confident understanding of its place in the total scheme of teaching and learning. By revealing faculty member's attitudes to its use the researcher has been able to recommend that the reflection upon how people might learn begins the professional process of enabling teachers to adopt the most appropriate form of ET.

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ملخص الدراسة

عنوان الدراسة: العناصر الرئيسة التي تؤثر في استخدام أعضاء هيئة التدريس للتقنيات التربوية في مؤسسات التعليم العالي وعلى وجه الخصوص في جامعة السلطان قابوس

تهدف هذه الدراسة الى تحديد وتأكيد وتوضيح العناصر الرئيسة التي تؤثر في فهم أعضاء هيئة التدريس في استخدامهم التقنيات التربوية في تدريسهم في جامعة السلطان قابوس، كما تسعى الى تلخيص نموذج يأخذ في الاعتبار تلك العناصر التي تربط بين النظريات التربوية وتطبيقاتها الهادفة في استخدام التقنيات التعليمية.

واستخدمت هذه الدراسة المنهج التفسيري الذي يدمج بين كل من الطرق النوعية والكمية في جمع البيانات وتحليلها وتفسيرها.

وحددت الدراسة خمسة عناصر رئيسة لها علاقة باستخدام المحاضرين بالجامعة للتقنيات التربوية. هذه العناصر اوحى بتأثيرها على فهم واتجاهات أعضاء هيئة التدريس في كيفية استخدامهم للتقنية التربوية وقيمتها في تدريسهم كما تم تكرير هذه العناصر عدة مرات وبالتالي اختبارها مقابل البيانات، كذلك تعكس هذه العناصر ان هناك اتفاق عام خاص بفهم واتجاهات المحاضرين نحو استخدام التقنيات التربوية في جامعات الشرق الاوسط التي تفخر بأنها جزء من النموذج الدولي في التعليم العالي. وكان إدراك أعضاء هيئة التدريس لقيمة وفعالية التقنيات التربوية العنصر الأكثر تأثيرا وتحديدًا لاتجاهاتهم والذي بالمقابل شجعهم على استخدامها في تدريسهم مع توفر المهارة وتطور المهنية لديهم.