

REFERENCES

- [1] T. Daniela and T. Georgi. “Didactical issues of e-learning- problems and future trends”. in *the proceedings of International Conference on Computer Systems and Technologies*. Varna, Bulgaria, 2005, pp. IV.12-1 - IV.12-5.
- [2] A. Nagy, P.A Bruck, A. Buchholz, Z. Karssen and A. Zerfass. *The impact of e-learning in e-content technologies and perspectives for the European market*. Berlin: Springer-Verlag, 2005, pp. 79–96.
- [3] M. Zembylas, (2008). Adult learners’ emotions in online learning. *International Journal of Distance Education*. 29, pp. 71–87.
- [4] D. D. Dayarathne and A. P. Madurapperuma. “Enhanced e-learning environments adaptable to the user emotions”. in *The proceedings of 2nd International Conference of Kansei Engineering & Affective Systems*. Japan, 2008, pp. 35.
- [5] T. U. Fredskild. (2008). “Optimizing the learning potential for the distance learning students: Focusing on the tension between experience and competence”. *E-learning & education (Eleed)*. 4. <http://eleed.campussource.de/archive/4/>.
- [6] E. Ryymin, J. Lallimo, K. Hakkarainen. (2008). Teacher’s professional development in a community. *International Journal of E-learning and Education*. 3(4), <http://eleed.campussource.de/archive/4/1251>.
- [7] P. Ekman. *Are there basic emotions?* 99(3), 1992, pp. 550-553,
- [8] D. R. Krathwohl, B. S. Bloom, B. B. Masia. *Taxonomy of Educational Objectives, the Classification of Educational Goals. Handbook II: Affective Domain*. New York: David McKay Co., Inc, 1973, pp 49-68.
- [9] S. Chaffar, and C. Frasson. “Inducing optimal emotional state for learning in intelligent tutoring systems”. in *Proceeding of International Conference of Intelligent Tutoring System*. Maceio, Brazil, 2004.
- [10] D. Goleman. *Emotional Intelligence*. New York, 1995, pp 37 – 67.

- [11] L. Shen, M. Wang, and R. Shen. (2009). “Affective e-learning: Using emotional data to improve learning in pervasive learning environment”. *Journal of Educational Technology & Society*. 12 (2), pp. 176–189.
- [12] T. C. Sandanayake and A. P. Madurapperuma. “Emotional reactions of undergraduates in digital learning environment”. *in the proceedings of e Asia 2009, International Conference on Information Technology*. Sri Lanka, 2009.
- [13] T. C. Sandanayake and A. P. Madurapperuma. “Enhancing the learning environment by identifying the learner behavior in an e-learning system”. *International Conference on Engineering Education & Research (ICEE & ICEER)*. Korea, 2009.
- [14] K. Nishino, T. Ohno, S. Mizuno, K. Aoki, Y. Fukumura. “A study on learning styles of Japanese e-learning learners”. *in the proceedings of 11th International Conference of Human and Computers*. JP, 2008, pp. 299 – 302.
- [15] R. W. Picard. *Affective computing*. MIT Press, Cambridge. 1997, pp. 4 – 155.
- [16] S. Lieb. *Principles of adult learning*. Vision, Fall. 1991, <http://honolulu.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/adults-2/htm>.
- [17] G. S. Lunney. *Emotional intelligence*. 2009, pp. 47-58.
- [18] B. Kort, R. Reilly, R.W. Picard. “An affective model of interplay between emotions and learning: Reengineering educational pedagogy-building a learning companion”. *in the Proceedings of the IEEE International Conference on Advanced Learning Technologies IEEE*. Los Alamitos: CA: 2001, pp. 43-46.
- [19] R. Plutchik. *Emotions: Psycho evolutionary review*, Harper & Row, ISBN 0-06-045235-8, 1980, pp. 12 – 21.
- [20] J. A. Russell. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology*. (36), pp. 1161–1178.
- [21] L. Shen, M. Wang and R. Shen. (2009). Affective e-learning: using emotional data to improve learning in pervasive learning environment. *Journal of Educational Technology & Society*. 12 (2). pp. 176–189.


- [22] R. Pekrun, A. Elliot, M. Maier. (2006). Achievement goals and discrete achievement emotions: A theoretical model and prospective test. *Journal of Educational Psychology*. 98(3). pp.583–597.
- [23] J. Cohen, P. Cohen, S. G. West and L. S. Aiken. *Applied multiple regression / correlation analysis for the behavioral sciences*. 3rd Ed. Lawrence Erlbaum Associates, 2003, pp 22 – 28.
- [24] P. Pintrich, D. A. F. Smith, T. Garcia and J. Wilbert. (1993). Motivated strategies for learning questionnaire (MSLQ). *Journal of Educational and Psychological Measurement*. 53. pp. 801-810.
- [25] D. Watson, A. L. Clark and A. Tellegen. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*. 54(6). pp. 1063-1070.
- [26] R. Pekrun, T. Goetz, A. C. Frenzel, P. Barchfeld and R. P. Perry. (2011). Measuring emotions in students' learning and performance: The achievement emotions questionnaire (AEQ). *Journal of Contemporary Educational Psychology*. 36. pp. 36–48.
- [27] M. J. Tsai. (2009). The model of strategic e-learning: Understanding and evaluating student e-learning from meta-cognitive perspectives. *Journal of Educational Technology & Society*. 12 (1). pp. 34–48.
- [28] T. C. Sandanayake. “Facing challenges of e-learning towards better learning”. *Proceedings of Conference on Higher Education in Sri Lanka of Sri Lanka Association for Improving Higher Education Effectiveness (SLAIHEE)*. Sri Lanka, 2009, pp. 9-10.
- [29] H. Maldonado, J. E. R. Lee, S. Brave, C. Nass, H. Nakajima, R. Yamada, K. Iwamura and Y. Morishima. “We learn better together: Enhancing e-learning with emotional characters”. in *the Proceedings of the conference of Computer Supported Collaborative Learning, International society of Learning Sciences*. 2005, pp. 408-417.

- [30] G. Gibbs. *Improving the quality of student learning*. Oxford, UK: Oxford Centre for Staff Development. 1992, pp. 15 – 133.
- [31] S. Brown, C. Rust and G. Gibbs. *Strategies for divergent assessment in higher education*. Oxford Center for Staff Development. 1994, pp. 13 – 25.
- [32] W. Houghton. *Learning and teaching theory for engineering academics: Engineering subject centre guide*. Loughborough: HEA Engineering Subject Centre. Instruction. 15, 2004. pp. 497-506.
- [33] C. Wenning. *Additional thoughts on deep versus surface learning*. Retrieved 02nd Jan, 2009, from Physics Teacher Education Programme: <http://www.phy.ilstu.edu/pte/311content/effective/deepsurf.html>.
- [34] J. Biggs. *Teaching for quality learning at university*. Buckingham: Society for Research into Higher Education & Open University. 1999, pp. 124 – 144.
- [35] R. M. Wallace, J. Kupperman, J. Krajcik and E. Soloway. (2000). Science on the web: students online in a sixth-grade classroom. *The Journal of the Learning Sciences*. 9 (1). pp. 75–104.
- [36] M. Coomey and J. Stephenson. *Online learning: it is all about dialogue, involvement, support and control - according to the research, in teaching and learning online: Pedagogies for new technologies*. J. Stephenson, Kogan Page, London, UK, 2001.
- [37] W. N. Mehanna. “The pedagogies of e-learning”. *Proceedings of Network Learning Conference*. UK, 2004.
- [38] J. Boettcher. *Pedagogy and Learning*. Florida State University. 1997, <http://www.csus.edu/pedtech/learning.html>.
- [39] A. Angehrn, T. Nabeth and C. Roda. *Towards personalised, socially aware and active e-learning systems*. Centre for Advanced Learning Technologies (CALT) – INSEAD, 2001, http://www.insead.edu/facultyresearch/faculty/personal/aangehrn/documents/Towards_personalised_socially_aware_active_e-learning_systems.pdf.


- [40] L. Alonso Díaz and F. Blázquez Entonado. *Are the functions of teachers in e-learning and face-to-face learning environments really different?. Educational Technology & Society*. 12 (4). 2009, pp. 331–343.
- [41] P. Ramsden. *Learning to teach in higher education*. London, UK: Routledge, 1992, pp. 45 – 67.
- [42] A. D. McManus. (2001). The two paradigms of education and the peer review of teaching. *NAGT. Journal of Geosciences Education*. 4(6). pp. 423-434.
- [43] L. D. Fink. *Active learning*. University of Oklahoma Instructional Development Program. 1999. <http://drjj.uitm.edu.my/>.
- [44] C. Bonwell and J. Eison. *Active learning: Creating excitement in the classroom*. AEHE-ERIC ISBN 1-87838-00-87. 1991, pp. 193-194.
- [45] D. A. Kolb. *Experimental learning*. Prentice Hall, New Jersey. 1984, pp. 21-30.
- [46] S. Benjamin. *Educational objectives of Bloom taxonomy*. Published by Allyn and Bacon, Boston. 1984.
- [47] Wikipedia. *Education*. 2010. <http://en.wikipedia.org/wiki/Education>.
- [48] S. E. Eroglu, A. Isiklar and H. Bozgeyikli. (2006). Research of university students' academic emotions regarding some variables. *Journal of Education Science and Psychology*. 2(9). pp. 1512-1801.
- [49] J. M. Dirkx. *The power of feelings: Emotion, imagination, and the construction of meaning in adult learning. New directions for adult and continuing education*. 89. 2001. pp. 63–72.
- [50] T. C. Sandanayake and A. P. Madurapperuma. “Mapping kansei engineering concepts into the activities of Bloom’s revised taxonomy”. *in the proceedings of 27th National Information Technology Conference (NITC)*. Sri Lanka, 2009. pp. 157 – 163
- [51] M. Zembylas, M. Theodoroub and A. Pavlakisb. The role of emotions in the experience of online learning: challenges and opportunities. *Educational Media International*. 45(2). 2008, pp. 107–117.

- [52] T. C. Sandanayake and A. P. Madurapperuma. "Conceptual model for e-learning systems using kansei engineering techniques". *A Preliminary Study, in the proceedings of International Multi Conference on Biometrics and Kansei engineering (ICBAKE – KEAS), IEEE*. Poland, 2009, pp. 148 – 152.
- [53] T. C. Sandanayake and A. P. Madurapperuma. "Affective setting for sustainable e-learning in higher education". *in the proceedings of 5th International Conference on information and Automation for Sustainability (ICIAfS). IEEE*. Sri Lanka, 2010, pp. 75- 80.
- [54] K. O'Regan. (2003). Emotion and e-learning. *Journal of Asynchronous Learning Networks*. 7(3), pp 78-92.
- [55] R. MacFadden. (2007). The forgotten dimension in learning: Incorporating emotion into web-based education. *Journal of Technology in Human Services*. 25(1/2), pp.85–101.
- [56] P. M. A. Desmet. *Measuring emotions*. Columbia University Press, New York. 2003. pp. 167-187.
- [57] P. Darbyshire, R. Bell and H. McDonald. *Testing the circumplex model of emotions in a consumer setting*. 2006. http://WWW/ANZMAC2006/documents/Darbyshire_Penny.
- [58] J. A. Russell. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology*. 39, pp.1161–1178.
- [59] J. L. Lemke. (2001). Articulating communities: Sociocultural perspectives on science education. *Journal of Research in Science Teaching*. 38(3), pp.296-316.
- [60] T. C. Sandanayake and A. P. Madurapperuma. "Novel approach for online learning through affect recognition". *in the proceedings of 5th International Conference on Distance Learning and Education IPCSIT*. 12. Singapore, 2011. pp. 67 – 72.
- [61] T. C. Sandanayake, A. P. Madurapperuma, D. Dias. (2011). Affective e-learning model for recognising learner emotions. *International Journal of Information and Education Technology*. 1(4). pp. 315-320.

- [62] C. Berg. *Academic emotions in student achievement: Promoting engagement and critical thinking through lessons in bioethical dilemmas*. 2008. pp. 34 - 56.
- [63] C. Conati and C. Merten. "Eye tracking to model and adapt to user meta cognition in intelligent learning environment". *in the Proceedings of International Conference on Intelligent User Interfaces*. 2007, pp:39 – 46.
- [64] A. P. Keenan and Y. K. Lee. (2006). The influence of system characteristics on e-learning use. *Journal of Computers and Education*. 47. pp. 222 – 224.
- [65] M. Njoo, T. Jong de. (1993). Exploratory learning with a computer simulation for control theory: learning processes and instructional support. *Journal of Research in Science Teaching*. 30(8), 1993. pp. 821-844.
- [66] M. Chi. "Self-explaining expository texts: The dual processes of generating inferences and repairing mental models". *Advances in Instructional Psychology*, Lawrence Erlbaum Associates. 2000. pp. 161-238.
- [67] M. A. M. Shaikh, and I. Mitsuru. "An affective role model of software agents for affective agent based e-learning by interplaying between emotions and learning". *in the proceedings of International Conference on Web Information Systems and Technology*. 2005. pp 449-456.
- [68] K. Valehn and C. Conati. (2000). Toward computer-based support of meta-cognitive skills: A computational framework to coach self-explanation. *International Journal of Artificial Intelligence in Education*. pp. 398-441.
- [69] P. R. De Silva, M. Osano, A. Marasinghe and A.P. Madurapperuma. (2006). The emotion intensity based robust adaptation model in interactive games. *Journal of Kansei Engineering*. 6-4. 2006. pp. 18-21.
- [70] P. Pintrich, David, A. F. Smith, T. Garcia and W. J. Mckeachie. (1993). Motivated strategies for learning questionnaire (MSLQ). *Journal of Educational and Psychological Measurement*. 53. pp.801-808.
- [71] D. Watson and A. L. Clark. *The PANAS-X: Manual for the positive and negative affects schedule – Expanded form*. Psychology Publications, Iowa Research Online. 1999. pp. 1-22.

- [72] A. Graesser, S. K. D. Mello, S. D. Craig, J. S. Witherspoon, J. Sullins, B. Mc Danial and B. Gholson. (2007). The relationship between affective states and dialog patterns during interactions with auto tutor. *Journal of Interactive Learning Research*. 19(2). pp. 293-312.
- [73] M. Nummenmaa. (2007). Emotions in a web-based learning environment. University of Turku, Finland. *British Journal of Educational Psychology*. 78(1). pp. 163–178.
- [74] G. Pask. *Learning strategies, teaching strategies, and conceptual or learning style*. Plenum, New York. 1988. pp. 83–100.
- [75] E. Geisler-Brenstein, R. R. Schmeck and J. Hetherington. An individual difference perspective on student diversity. *Higher Education*. 31. 1996, pp. 73–96.
- [76] K. R Scherer. The dynamic architecture of emotion: Evidence for the component process model. *Cognition and Emotion*. 23. 2009. pp. 1307–1351.
- [77] C. Kasworm. *Emotional challenges of adult learners in higher education*. *New directions for adult and continuing education*. Wiley Periodicals, DOI: 10., 2008. pp.102-110.  University of Moratuwa, Sri Lanka
Electronic Theses & Dissertations
www.lib.mrt.ac.lk
- [78] M. G. Moore and G. Kearsley. *Distance education: A systems view*. Belmont, CA: Wadsworth Publishing. 1995. pp. 177-183.

APPENDIX I: PEDAGOGY REVIEW REPORT

Pedagogy Review Report	
<i>Reviews Name:</i>	
<i>Please provide your comments on each activity</i>	
1	The Lesson Materials
2	Assessment Techniques
3	Forums and Discussions
4	Audio and Video Content
5	Graphics and Presentation of Facts
	 University of Moratuwa, Sri Lanka Electronic Theses & Dissertations www.lib.mrt.ac.lk
6	Lesson Break Activities
7	Time Allocation for the Activities
8	Overall Assessment of the Course

APPENDIX II: MARKING SCHEME OF DISCUSSION FORUM

Criteria	Marks
No contribution	0
Participation	1
Relevant answer without reasons	2
Relevant answer with reasons	3
Relevant answer with reasons + Showing high level of interaction	4
Relevant answer with reasons + Showing high level of interaction + Setting new directions for discussion	5



University of Moratuwa, Sri Lanka
Electronic Theses & Dissertations
www.lib.mrt.ac.lk


APPENDIX III: MARKING CRITERIA OF THE MINI PROJECT

Item	Marks
Format	20
Originality of the facts	20
Evidence of depth of research and writing style and clarity	20
Introduction , body and conclusion	10
References	10
Relevance to the topic	10
Technical accuracy	10
Total	100



University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
www.lib.mrt.ac.lk

**APPENDIX IV: PEER REVIEW REPORT OF MINI GROUP
PROJECT**

Peer Review Report						
Group No :						
Reviewers' Name :						
	<i>Question</i>	<i>Very Good</i>	<i>Good</i>	<i>Normal</i>	<i>Poor</i>	<i>Very Poor</i>
1	Participation in the forum	⊖	⊖	⊖	⊖	⊖
2	Replying to other's comments	⊖	⊖	⊖	⊖	⊖
3	Sharing knowledge to develop the answer	⊖	⊖	⊖	⊖	⊖
4	Information searching and presenting	⊖	⊖	⊖	⊖	⊖
5	Team working abilities	⊖	⊖	⊖	⊖	⊖
6	Time management	⊖	⊖	⊖	⊖	⊖
<p>Please provide your comments to the peer to get improved his/her online learning:</p> <p>-----</p> <p>-----</p> <p>-----</p> <p style="text-align: center;">  University of Moratuwa, Sri Lanka Electronic Theses & Dissertations www.lib.mrt.ac.lk </p> <p>-----</p> <p>-----</p> <p>-----</p> <p>-----</p> <p>-----</p> <p>-----</p> <p>-----</p> <p>-----</p>						


**APPENDIX V: ONLINE ACHIEVEMENT EMOTION
QUESTIONNAIRE (OLAEQ)**

#	Question	1 Strongly Disagree	2 Disagree	3 Neither agree nor Disagree	4 Agree	5 Strongly Agree
BEFORE STUDYING						
1	I look forward to studding online					
2	I get so nervous that I don't even want to online					
3	I feel confident that I will be able to master the online learning material					
4	Because I get so upset over the amount of material, I don't even want to begin the studying					
5	When I have to study I start to feeling queasy					
6	When I read the learning material I still have to read the instructions, I get anxious					
7	Because I m board I have no desire to learn online					
8	I have an optimistic view towards studying online					
9	I feel ashamed about my constant procrastination					
10	I get angry when I have to study					
11	My lack of confidence on online learning manes me exhausted before even I log into the LMS					
12	I'm annoyed that I have to study so much alone					
13	I would rather put off this boring work till tomorrow					
14	I feel optimistic that I will make good progress at learning through online					
15	I feel hopeless when I think about studying online					
DURING STUDYING						
16	I worry whether I'm able to cope with all my work					
17	Because I'm bored I get tired sitting at my computer					
18	I feel confident when studying online					
19	I feel ashamed that I can't absorb the simplest instructions given					
20	I get so angry I feel like pulling the computer out of the window					
21	My hopefulness undermines all my energy					
22	While studying online I feel like distracting myself in order to reduce my anxiety					
23	The learning material bores me so much that I feel depleted					
24	The thought of achieving my learning objectives inspires me					
25	I feel ashamed because I am not as adept as other in					

#	Question	1 Strongly Disagree	2 Disagree	3 Neither agree nor Disagree	4 Agree	5 Strongly Agree
	studying					
26	When I sit at the computer for a long time, my irritation makes me restless					
27	I'm proud of my capacity					
28	I feel so helpless during online learning that I can't give my studies my full effort					
29	I find my mind wandering while I study					
30	I study more than required because I enjoyed it so much learning online					
31	As time runs out my heart begins to race					
32	The learning material bores me to the death					
33	My sense of confidence motivates me learning online					
34	When somebody notice how little I understand I avoid the participation in online learning community					
35	Studying makes me irritated					
36	I wish I could quit because I can't cope with it					
37	When my studies are going well, it gives me rush					
38	I get tense and nervous while studying					
39	While studying this boring learning material, I spend my time thinking of how time stands still					
40	I turn red when I don't know the answer to questions in the quiz					
41	I get angry while studying					
42	When I solve difficult problem in my studying, my heart beats with pride					
43	I'm resigned to the fact that I don't have the capacity to master this learning material					
44	I enjoy the challenge of learning the online learning material					
45	The subject scares me since I don't fully understand it					
46	While studying I seem to drift off because it's so boring					
47	I feel ashamed					
48	I get annoyed about having to study					
49	Because I want to be proud of my accomplishment, I am very motivated					
50	I feel helpless during learning online					
51	I enjoy dealing with course material					
52	Worry about not completing the learning material makes me sweat					
53	Studying for my courses bores me					

#	Question	1 Strongly Disagree	2 Disagree	3 Neither agree nor Disagree	4 Agree	5 Strongly Agree
54	I feel embarrassed about not being able to fully explain the material to other friends					
55	When I excel at my work, I swell with pride??					
56	I get physically excited when my studies are going well					
57	Online learning is dull and monotonous					
58	I feel ashamed when I realised that I have the lack of ability of understanding online learning					
59	I enjoy acquiring new knowledge					
60	The learning material is so boring that I find myself day dreaming					
AFTER STUDYING						
61	I worry whether I have proper understand the learning material					
62	Because I have had so much troubles with the course material, I avoid discussing it with the learning community					
63	After extended studying, I m so angry that I get tense					
64	I m proud of myself					
65	After studying I'm resigned to the fact that I haven't got the ability of learning online					
66	I am so happy about the progress I made that I am motivated to continue studying online					
67	When I can't keep up with my studies it makes me fearful					
68	My memory gaps embarrass me					
69	I'm discouraged about the facts that I'll never learn the learning material					
70	Reflecting on my progress in online assessments makes me happy					
71	I don't want anybody to know when I haven't been able to understand something					
72	I think I can be proud of my accomplishments at online learning					
73	I feel resigned					
74	Certain topics are so enjoyable that I am motivated to do extra reading about them					
75	I worry because my abilities are not sufficient for my programme of studies					

APPENDIX VI: PUBLICATIONS AND PRESENTATIONS

- T. C. Sandanayake, A. P. Madurapperuma, and D. Dias. (2011). Affective e-learning model for recognising learner emotions. *International Journal of Information and Education Technology*. 1(4), pp. 315-320.
- T. C. Sandanayake and A. P. Madurapperuma. “Novel approach for online learning through affect recognition”. *5th International Conference on Distance Learning and Education IPCSIT*. 12. Singapore, 2011. pp. 67 - 72
- T. C. Sandanayake and A. P. Madurapperuma. “Affective setting for sustainable e-learning in higher education”. *5th International Conference on information and Automation for Sustainability (ICIAfS), IEEE*. Sri Lanka, December, 2010. pp. 75 - 80.
- T. C. Sandanayake and A. P. Madurapperuma. “Emotional reactions of undergraduates in digital learning environment”. *e-Asia 2009: International Conference on Information Technology*. Sri Lanka. December, 2009.
- T. C. Sandanayake and A. P. Madurapperuma. “Mapping Kansei engineering concepts into the activities of Bloom’s revised taxonomy”. *27th National Information Technology Conference (NITC)*. Sri Lanka. September, 2009. pp. 157 – 163.  www.lib.mrt.ac.lk
- T. C. Sandanayake and A. P. Madurapperuma. “Enhancing the learning environment by identifying the learner behaviour in an e-learning system”. *International Conference on Engineering Education & Research (ICEE & ICEER)*. Korea. August, 2009.
- T. C. Sandanayake and A. P. Madurapperuma. “Conceptual model for e-learning systems using Kansei engineering techniques, A preliminary study”. *International Multi Conference on Biometrics and Kansei Engineering (ICBAKE – KEAS)*. IEEE, Poland. June, 2009. pp. 148 – 152.
- T. C. Sandanayake. “Facing challenges of e-learning towards better learning”. *Proceedings of Conference on Higher Education in Sri Lanka of Sri Lanka Association for Improving Higher Education Effectiveness (SLAIHEE)*. May, 2009, pp. 9 – 10.