Abstract

This paper provides educationalists as well as researchers in computer science and engineering with a study of an interdisciplinary challenging pedagogical issue. More specifically, that presented study resulting in a set of interesting findings originated from adopted realistic Artificial Neural Network's (ANNs) modeling, which associated to two educational analogical feedback / assessment processes. This piece of research considers comparative analysis and evaluation study of an educational phenomenon issue for two diverse teaching/learning methodologies namely:{Blended Learning (BL), and Computer Aided Learning (CAL)}. More precisely, introduced issue of this work addresses the two summative and formative assessment processes applied in educational field practice. Accordingly, this issue concerned mainly with modeling of two practical field case studies considering the two items of educational feedback/assessment. In other words, assessment is used in many ways in education, a great deal of attention is now given to its use in helping teaching and learning, described as the two performance assessment items (summative and formative). These both are classified as: assessment for learning (A f L), or formative assessment. and assessment of learning (A O L),
or summative assessment. It is noticed that (A f L), did predict a substantial amount of course outcome and its validity observed to pave the way for diagnostic use and remedial teaching. However, (A O L) is focused on summarizing what students know or can do at certain times in order to report their academic progress, and achievement. Herein, two parametric factor values of ANN (gain, and learning rate factors), have been considered for the two suggested instructional methodologies. That is considered in order to compare, analyze, and evaluate dynamically two items of academic performance namely: (Academic achievement outcome & Learning convergence time) for both methodologies. Interestingly, after running of realistic ANN computer modeling for different numbers of neurons -that are contributing to learning process-results in a investigative, comprehensive, and innovative systematic analysis of individual students’ differences. Finally, after performing perceptive evaluation comparing between two case studies of obtained experimental field results, two interesting findings have been concluded. Firstly, while comparing computed sets of statistical parameters, associated to the presented instructional methodologies (BL&CAL), that resulted in the observed analogy between both sets. Secondly, in the context of Feedback/Assessment performance, regarding both (BL& CAL); either Formative, or Summative feedback /assessments, have been observed to be well analogous to each other.

References


2. Balderas "The influence of information technology in the daily work of mathematics teachers". Available online at: http://math.unipa.it/~grim/EBalderas.PDF


5. Hassan M. H. Mustafa ,et.al." On Optimality of Teaching Quality for a Mathematical Topic Using Neural Networks (With a Case Study)". Published at EDUCON 13 conference which held in Berlin, Germany from 13-15 March 2013.

6. H. M. Mustafa, Ayoub Al-Hamadi, and Mohammed H. Kortam "On Assessment of Teaching a Mathematical Topic Using Neural Networks Models (With a case study)" Published at COMPUTER SCIENCE AND APPLICATION, VOL. 1, NO. 2, FEBRUARY, 2012, pp.12-19. The paper is also available online at : http://researchpub.org/journal/csa/number/vol1-no2-2.pdf


8. (Aragón, 96) "The influence of information technology in the daily work of mathematics Teachers" Angel Balderas Puga. Available online at: http://math.unipa.it/~grim/EBalderas.PDF

10. Interactive practice with long division with no decimals: Daisy Maths - Long Division http://Argyll.epsb.ca/jreed/extras/longdiv


12. H. M. Mustafa, and Ayoub Al-Hamadi "On Teaching Quality Improvement of A Mathematical Topic Using Artificial Neural Networks Modeling" (With A Case Study)”. Published at 10th (Anniversary!) International Conference Models in Developing Mathematics Education”. Hold in Dresden, Saxony, Germany on September 11-17, 2009.


15. Brianna Flavin "8 Surprising Ways Computer Science Benefits Society [2018 & Beyond]-“Why is computer science important?” This article was originally published in December 2015. It has since been updated to include information relevant to 2018. Retrieved on 08/29/2018 online at:https://www.rasmussen.edu/degrees/technology/blog/ways-computer-science-benefits-society/


realitymeets-education/.


12:05:00 PM. Available online at: https://blog.insynctraining.com/26-proving-the-value-of-blended-learning


https://blog.labster.com/what-is-blended-learning

30. (Wimshurst & Manning 2013). "Feed-forward assessment, exemplars and peer marking: evidence of efficacy" Pages 451-465 | Published online: 18 Jan 2012 at:
https://doi.org/10.1080/02602938.2011.646236


32. https://www.google.com.sa/search?q=error+correction+learning+in+neural+network&sa=X&ved=2ahUKEwiiieLW28DfAhUCixoKHAmMDk4Q1QIoAHoECAIQAQ&biw=1366&bih=608

33. Error correction learning in Artificial neural networks. Available online at:
https://en.wikibooks.org/wiki/Artificial_Neural_Networks/Error-Correction_Learning


40. Mustafa, et. al. "On Assessment of Brain Function Adaptability in Open Learning Systems Using Neural Networks Modeling (Cognitive Styles Approach)" published at The IEEE International Conference on Communications and Information Technology ICCIT-2011, held on
On Interdisciplinary Comparative Study of Analogical Feedback/Assessment Models Applied in Blended Learning Versus Computer Aided Learning using Artificial Neural Networks


41. H.M. Mustafa "Building up bridges for natural inspired computational models across behavioral brain functional phenomena; and open learning systems" A tutorial presented at the International Conference on Digital Information and Communication Technology and its Applications (DICTAP2011) held from June 21-23, 2011, at University de Bourgogne, Dijon, France.


49. H.M. Hassan" On Simulation of Adaptive Learner Control Considering Students' Cognitive Styles Using Artificial Neural Networks (ANNs)" Published at CIMCA, Austria. 28-30 Nov.2005.


53. M.Fukaya, et.al "Two level Neural Networks: Learning by Interaction with Environment",


60. Question Mark for Assessment Management, Create, Deliver, and Deliver. Available online at: https://www.questionmark.com/us/Pages/default.aspx


63. Types of summative assessment and formative assessment Available online on : 09/01/18 at: https://resourced.prometheanworld.com/types-of-summative-formative-assessment/


74. Chi-Cheng Chang; Kuen-Ming Shu; Chaoyun Liang; Ju-Shih Tseng; Yu-Sheng Hsu (2014) "Is Blended e-Learning as Measured by an Achievement Test and Self-Assessment Better than Traditional Classroom Learning for Vocational High School Students?" Published at // International Review of Research in Open & Distance Learning; Apr 2014, Vol. 15 Issue 2, p213.


77. Hassan M. H. Mustafa "On Brain Based Modeling of Blended Learning Performance Regarding learners' Self-assessment Scores Using Neural Networks (Brain Based Approach)". Published at IABL-2016 the IABL conference International Association for Blended Learning (IABL) will be held in Kavala Greece on 22-24 April 2016.


79. Hassan M. H. Mustafa et al "An Overview on Evaluation of E-Learning/Training Response Time Considering Artificial Neural Networks Modeling." Paper Published in Journal of
Hassan M. H. Mustafa et al. "Application of Artificial Neural Networks Modeling for Evaluation of E-Learning/ Training Convergence Time." Paper Published in American Journal of Education and Learning, 2(2): 159-179. Funding: This study received no specific financial support. This work is licensed under a Creative Commons Attribution 3.0 License Competing Interests: History: Received: 7 March 2017/ Revised: 22 September 2017/ Accepted: 4 October 2017. Publisher: Online Science Publishing On 19th October 2017.


**Index Terms**

Computer Science

Artificial Intelligence

**Keywords**

Blended learning; Brain based learning; Computer Aided Learning; Neural Networks Modeling; Formative, and summative feedback /assessments.