

DESIGN AN INTERACTIVE LEARNING MODEL: USING PERSUASIVE  
TECHNOLOGY TO LEARN CHILDREN ARABIC ALPHABETS

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I dedicate this project to my beloved parents and my beloved husband , thank you for the moral support you have given me throughout my academic life.

To my respected supervisor, Dr. Aryati Bt Bakri

To my beloved country, Palestine

To all my brothers and sisters

To all my friends

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## ABSTRACT

The rapid development of courseware technology has achieved a supportive impact in the field of education. Using interactive learning in the courseware is a more hands-on, real-world process of relaying information to children. Despite interactive learning motivates children to explore and learn effectively, there is still a need to exploit it in teaching children Arabic alphabets. The aims of this project are to understand the concept, steps, principles and impacts of interactive learning using Persuasive Technology in the learning process then design an interactive learning model to teach children who aged between 18 months and 4 years old Arabic alphabets. In order to reach this aims, Persuasive Technology was used to understand the children's behaviour and encourage them to learn Arabic alphabets since target age. An interactive learning model was proposed by integrating four different means of technology to support the learning process which are; Flashcards, Persuasive Design, Cognitive Theory of Multimedia Learning (CTML) and Multimedia Principles. The effectiveness and usability of this model was evaluated by developing Arabic alphabets courseware and distributed it between numbers of young children. The effectiveness was assessed through pre and post testing while the usability testing based on five factors of usability which are; motivation, learning, memorability, performance and effectiveness. These factors were assessed by using a questionnaire for the children's parents who have observed their children behaviour and answered the questions. Furthermore, a video observation was recorded to ensure the accuracy and reliability of the results. Analysing this information showed that, the interactive learning model can influence effectively in persuading young children to learn Arabic alphabets and this model provides an alternative way to motivate young children to learn Arabic alphabets before learn the IQRA technique.

## ABSTRAK

Kepesatan pembangunan dalam perisian teknologi telah mendapat banyak sokongan dalam bidang pendidikan. Dengan menggunakan kaedah pembelajaran interaktif di dalam perisian, maklumat boleh disampaikan kepada kanak-kanak dengan menggambarkan proses di dalam situasi sebenar. Walaupun pembelajaran interaktif mendorong kanak-kanak untuk meneroka dan belajar dengan berkesan, namun kajian untuk mengeksplorasi cara pengajaran abjad Arab masih diperlukan. Matlamat projek ini adalah untuk memahami konsep, langkah-langkah, prinsip dan kesan pembelajaran interaktif menggunakan Teknologi Pemujukan seterusnya mereka cipta model pembelajaran interaktif untuk pembelajaran abjad Arab kanak-kanak berusia antara 18 bulan hingga 4 tahun. Dalam usaha untuk mencapai matlamat ini, Teknologi Pemujukan telah digunakan untuk memahami perubahan tingkah laku kanak-kanak dan menggalakkan mereka untuk belajar huruf Arab. Model pembelajaran interaktif telah dicadangkan dengan menggabungkan empat teknologi yang berbeza untuk menyokong proses pembelajaran iaitu; Flashcards, Rekabentuk Pemujukan, Teori Kognitif Pembelajaran Multimedia dan Prinsip Multimedia. Keberkesanan dan kebolehgunaan model ini telah dinilai dengan membangunkan perisian huruf Arab dan diedarkan kepada beberapa kanak-kanak. Keberkesanan dinilai melalui ujian pra dan pasca manakala ujian kebolehgunaan berdasarkan lima faktor kebolehgunaan iaitu; motivasi, pembelajaran, daya ingatan, prestasi dan keberkesanan. Faktor-faktor ini telah dinilai dengan menyoal selidik ibu bapa kanak-kanak yang telah memerhatikan tingkah laku anak-anak mereka dan mereka dikehendaki menjawab soalan-soalan yang disediakan. Analisis maklumat ini menunjukkan bahawa model pembelajaran interaktif boleh mempengaruhi secara berkesan dalam memujuk kanak-kanak untuk belajar huruf Arab dan model ini juga menyediakan satu cara alternatif untuk memberi motivasi kepada kanak-kanak untuk belajar huruf Arab sebelum belajar teknik IQRA itu.

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## **CHAPTER 1**

### **PROJECT OVERVIEW**

#### **1.1 Introduction**

The rapid evolution of the technology world over the past two decades has dramatically changed the learning practices as computers becoming more invaluable tools for teaching and learning Arabic language. The importance of Arabic Language is tied to being the language of the Qur'an and Muslims around the world are highly encouraged to understand the Qur'an language to facilitate its reciting.

According to Hasan (2006) IQRA is one of the faster learning methods that has been introduced by Ministry of Education in Malaysia as the process of teaching and learning the Qur'an at primary schools since 1995. Due to the complicated nature of Arabic language; where the entire meaning of the word or the phrase can be changed for a minor difference in the pronunciation and typing, there is a need for an effective tool to encourage young children to learn Arabic alphabets before starting learn IQRA method.

Interactive learning is a more hands-on, real-world process of relaying information to children. Interactive learning empowers children to explore and they are invited to participate in the conversation, through technology. Interactive learning helps children pay more attention during the lesson, and are able to pick up more information. It is also considered to be more fun, and usually more successful to

develop children minds and increase their abilities to learn easier and memorize quicker.

## **1.2 Problem Background**

Early childhood is the most life stages density with respect to brain development. Thus, the child alert and nutrition appropriate ways essential for development during the first three years of his life. Child's brain, specifically in those years, is more sensitive to the effects of the external environment. And affect a child's development rapidly growing intellectual, social and emotional. This helps to develop in ensuring that the child reaches his full potential and be a productive element in a rapidly changing global society.

Whenever the child was alert early his pace of development and learning increased. It is worth mentioning that the language and intellectual development of the things that is particularly important during the period ranging from six months and the first three years. When children spend early years of their lives in an environment with less alert or less support in both emotional and physical, the development of the brain is affected, leading to growth retardation intellectual capacity, social and behavioural (Media Centre, 2009).

Children since six months are glowing to explore technology around the home and they are possessed by sound and music, and love interactive musical instruments. According to DR. Leon Straker's, children start using computer as per reports at present in three years, they can play games, access Internet, watch YouTube and even download music.

Longitudinal Studies demonstrated that children who enrolled kindergarten programs excelled on their peers who did not attend kindergarten in Intelligence

Quotient (Ceci, 1991), measures to adapt psychological and behaviour (Anderson, 1992), the educational attainment of reading, writing, math, language and spelling (Entwisle et al., 1987) and in the repetition rate and return of some grades. Indeed, the positive impact of the enrolment in kindergartens in the lives of these students exceeded the teenage; longitudinal studies revealed the positive impact of kindergartens in increase the graduation rates, improve the employment opportunities and engage in the labour market (Schweinhart et al., 1993). Therefore, the attention of pre-primary education stage become one of the modern global trends, as not take advantage of this stage or weakness may lead to losses and negative consequences on the child's personal life and education, thus economic losses to the state. Hence, the care of the kindergarten objectives, and its programs, was begun globally.

The stage of early education finds more attention from the governments in the developed countries and many of developing countries such as Saudi Arabia, Jordan, Palestine and others. For instance, the kindergartens in Saudi Arabian aim to build the capabilities of the child in linguistic, moral, physical, religious, .ect. In this stage, children learn the Arabic alphabets and numbers; they learn how to pronounce and write them. Furthermore, the children learn some of short Sura of the Quran in order to configure the Islamic direction based on uniformity which corresponded to encroachment. In addition to accustom the child to etiquette, facilitate the acquisition of Islamic virtues and care of the child's moral, mental and physical development according to the requirements of Islamic law.

On the other hand, the Early childhood care and education (ECCE) in Malaysia starts to teach children Malay and English alphabets in the age of five years, a later age in children's education. For Islamic education, children should join Islamic Kindergarten which teaches children only read Arabic alphabets in the age of five years. On the other hand, the Ministry of Education in Malaysia has been introduced IQRA method in primary schools since 1995 for learning the Qur'an. According to Hasan (2006) some teachers in primary school said that the implementation of teaching IQRA method in National Schools has many weaknesses



which results in a number of students being unable to read the Qur'an, even after six years in primary school.

Furthermore, the teaching as persuasion metaphor recognizes that learning involves more than integrating new knowledge; it involves the intention to change one's belief. Therefore, the responsibility for change is putted on the learner, not the teacher by the teaching as persuasion. Students willingly decide to change their beliefs by bringing together individual ideas of students against those new concepts that teachers are trying to convey (Sinatra and Kardash, 2004). Alexander et al. (2002) argues that the veracity of persuasion depends on the importance of the issue, and the strength or credibility of the arguments, evidence, or examples presented.

Whereas, Arabic language is very important for Muslims around the world because it is the basic language of Islam sources, the Qur'an and the Sunnah (Zubair, 2012). Thus, it is essential for Muslims to learn Arabic language in order to understand the Qur'an, the Sunnah and other literature on religious topics available in Arabic language. Thus, Muslims are very seriously to teach Arabic language to their children since childhood, in order to facilitate their recitation of the Qur'an (Khan, 2012).

### **1.3 Problem Statement**

In order to address key issues as mentioned at previous sections, the main question that has been highlighted in this research is:

“How can interactive learning be applied using Persuasive Technology to design an effective model to teach young children Arabic alphabets?”.

## **1.4 Project Objectives**

The objectives of this study are listed below:

- I. To apply Persuasive Technology as an interactive learning method that persuades young children to change their behavior in order to learn Arabic alphabets.
- II. To design an effective learning model that integrates Persuasive Technology to motivate young children learn Arabic alphabets

## **1.5 Scope of Study**

The scope of this project has been identified to ensure that this model is suitable to use.

### **1.5.1 Target Audience**

The target users for this project are the children aged between 18 months to 4 years old. It is because children in this age are starting to learn more about things around them.

### **1.5.2 Research Scope**

The research scope is focusing on identifying an appropriate technology to design an interactive learning model for teaching and learning children Arabic alphabets in order to facilitate reading and reciting the Quran.

## **1.6 Significant of Research Study**

The main contribution of this project is to ensure that the deliverance of the information together with the interactive learning can motivate young children to learn Arabic alphabets effectively.

This project can provide an interactive learning environment to young children to motivate them to learn Arabic alphabets effectively before learn using the IQRA technique. Besides, it also can help parents at home because some parents are not familiar with the suitable method to teach their children to read and pronounce correctly. In addition, this project can also be used at preliminary school as an aid learning tools in classroom.

## **1.7 Chapter Summary**

This chapter presented an overall overview about the main points of this project. The problem background and statement have been discussed. The project objectives, scope and importance have been described.

## REFERENCES

- Abdollah N., Wan Ahmad F., and Patah Akhir E.A. (2011). Usability Evaluation for 'Komputer Saya': Multimedia Courseware for Slow Learners. Springer-Verlag: Berlin Heidelberg.
- Abdul Ghani N., Hamin N., and Ishak N. (2006). Applying mastery learning model in developing e-tuition science for primary school students. *Malaysian Online Journal of Instructional Technology*. 1(2), 43-49.
- Alexander, P. A., Fives, H., Buehl, M. M., and Mulhern, J. (2002). *Teaching as persuasion*. *Teaching and Teacher Education*, 18, 795-813.
- Anderson, B. E. (1992). Effects of day-care on cognitive and socioemotional competence of thirteen-year-old Swedish schoolchildren. *Child Development*. 63, 20-36.
- Asha (2012). *Articulation and Intelligibility of Speech in Young Children: FAQ for Parents*. Hearing Speech & Deafness Center. Retrieved on 15th May, 2013 from:  
<http://www.earlyinterventionsupport.com/development/speech/articulation.aspx>
- Asrol Bin Hasan. (2006). *Powerful Play: Using Educational Toys in the Iqra' Learning Method for Preschoolers*. Thesis Master Design Technology, Universiti Teknologi MARA, Selangor.
- Attwell G. (2006). *Evaluating E-learning A Guide to the Evaluation of E-learning*. Creative Commons: California, USA.
- At-Tirmidhi. *Virtues of reciting the Qur'an*. Retrieved on 15th October, 2012 from:  
[http://www.readwithtajweed.com/tajweed\\_Intro.htm](http://www.readwithtajweed.com/tajweed_Intro.htm)
- Baharudin, S. I., M. Ismail, I. Nasir, S. (2010). STAr : Story Telling for Arabic Language. *Proceeding of the Information Retrieval & Knowledge Management, (CAMP), 2010 International Conference*, 143 - 146. 16-18 March, Selangor, Malaysia.
- Bahrudin I.A., Muhammad M., Abu Nawawi M.I, Saharudin I.N., Mohd Din H., Azuan Ali M. and Abdullah M.E. (2011). Development of Interactive

- Courseware for Learning Basic Computer System Components. *American Journal of Economics and Business Administration*. 3 (1), 132-138.
- Bailey, H. J., and Milheim, W. D. (1991). A comprehensive model for designing interactive video based materials. *Proceeding of the Ninth Conference on Interactive Instruction Delivery*. Orlando, FL: Society for Applied Learning Technology Conference.
- Barker, P. (1994). Designing interactive learning. In de Jong, T. and Sarti, L. (Eds), *Design and production of multimedia and simulation-based learning material*. Dordrecht : Kluwer Academic Publishers.
- Baxter, L. 2011. *Why Persuasive Design Should Be Your Next Skill Set*. UX Magazine. Retrieved in 21st November, 2012, from <http://uxmag.com/articles/why-persuasive-design-should-be-your-next-skill-set>
- Bloom, Benjamin S., e. (1956). *Taxonomy of Educational Objectives: The Classification of Educational Goals*. By a committee of college and university examiners. Handbook 1: Cognitive Domain, New York, David McKay Co Inc.
- Bocklet, T., Winterholler, C., Maier, A., Schuster, M., and Noth, E. (2009). *An Automatic Screening Test for Preschool Children: Theory and Data Collection*. Workshop on Child, Computer and Interaction. Retrieved from <http://www5.informatik.uni-erlangen.de/Forschung/Publikationen/2009/Bocklet09-AAS.pdf>
- Ceci, S. J. (1991). How much does schooling influence general intelligence and its cognitive components? A reassessment of the evidence. *Developmental Psychology*. 27(5), 703-22.
- Dick, W., & Carey, L. (1996). *The Systematic Design of Instruction* (4th Ed.). New York: Haper Collins College Publishers.
- Dick, W. (2006). The dick and carey model: Will it survive the decade? *Educational Technology Research and Development*, 44(3), 1042-1629.
- Diouri, M. (2009). *Blending the Old and New Ways of Teaching Tools: Revolutionizing Traditional Arabic Language Learning & Teaching*. ARABELE 2009 International Congress on Teaching Arabic as a Foreign Language. Spain.

- Dockstader, J. (1999). Teachers of the 21st century know the what, why, and how of technology integration. *T H E Journal*, 26 (6), 73-74.
- Early Childhood Department. (2008). الطفولة المبكرة: أخطر مراحل النمو العقل, *Early Childhood: the most dangerous stages of Mind growth*. Retrieved in 14<sup>th</sup> September, 2012, from: <http://matnas.dabburiya.net/online/matnas-sections/child-development/19-general/184-house-prices-to-fall-9-in-2008.html>
- Eisner, W. E. (2000). BENJAMIN BLOOM 1913–99. Prospects: the quarterly review of comparative education, Paris, UNESCO: International Bureau of Education, XXX(3).
- Ekhsan, H. M., Ahmad, S. Z., Abdul halim, S., Hamid, J. N. ,and Mansor, N. H. (2012). The implementation of interactive multimedia in early screening of dyslexia. *Proceeding of the 2012 International Conference on Innovation, Management and Technology Research (ICIMTR2012)*. 21-22 May, Malacca, Malaysia: IEEE.
- Entwisle, D. R., Alexander, K. L., Cadigan, D., and Pallas, A.M. (1987). Kindergarten experience: Cognitive effects or socialization. *American Educational Research Journal*. 24, 337-364.
- Faryadi Q. (2012). The Architecture of Interactive Multimedia Courseware: A Conceptual and an Empirical-Based Design Process: Phase One, a *International Journal of Humanities and Social Science*, 2(3).
- Fogg, B. (2003). *Persuasive Technology: Using Computers to Change What We Think and Do*. San Francisco: Morgan-Kaufmann.
- Fogg, B. (2009a). *Creating persuasive technologies: an eight-step design process* *The 4th International Conference on Persuasive Technology*. New York: USA
- Fogg, B. (2009b). A behaviour model for persuasive design. *Proceedings of the 4th international Conference on Persuasive Technology*. 1-7. New York, USA
- Garner, K. H. (1991). 20 rules for arranging text on a screen. In R. B. Frantzreb (Ed.), *Training and development yearbook 1991 edition*. Englewood Cliffs, NJ: Prentice Hall.
- Gagné, R. M., Briggs, L. J., & Wager, W. W. (1992). *Principles of instructional design* (4th ed.). Forth Worth, TX: Harcourt Brace Jovanovich College Publishers

- Gagne, R. M. (2000). Mastery learning and instructional design. In Rita C. Richey (Ed.), *The legacy of Robert Gagne*. NY: Clearing House.
- Grantham-Mcgregor, S. M., Cheung, Y.B., Cueto, S., Glewwe, P., Richter, L., and Strupp, B. (2006). Developmental potential in the first 5 years for children in developing countries. *Lancet*, 369, 60-70.
- Heinich, R., Molenda, M., Russell, D. J., and Smaldino, E. S. (2002). *Instructional Media and Technologies for Learning (7/E)*. Upper Saddle River, N.J.: Merrill.
- Herzon C., Kaniasty E., Shor K., and Bevan N. (2011). *Usability Testing*. retrieved on 2nd May, 2013 from: <http://www.usabilitybok.org/usability-testing>
- Hoon S. T., Chong S. T., Ngah N. A. and Kee L. K. (2009). The Effectiveness of an Interactive Courseware Using Three Different Strategies. Reading in Technology and Education: *Proceeding of ICICTE*.
- Huagland, S. (1992). The effect of computer software on preschool children's developmental gains. *Journal of Computing in Childhood Education*, 3, 15–30.
- Jaafar A. (2008). Malaysian Smart School Courseware Usability study: The Effectiveness of Analytical Evaluation Technique Compared to Empirical Study. *Proceeding of the WSEAS Transactions On Information Science & Application*.
- Keller, J. (1983). *Use of the ARCS Model of Motivation in Teacher Training*. IDD and E Working. 10.
- Keller, J. M., Katsuaki, S. (2004). Learning Motivation and E-Learning design: A Multinationally Validated Process. *Journal of Educational Media*, 29 (3), 229-239.
- Kennington, L. (2010). Young children and technology. *Learning together series*, 13.
- Khan, M. (2012). *The Importance of Arabic Language*. Retrieved on October 10<sup>th</sup>, 2012, from <http://muslim-academy.com/the-importance-of-arabic-language>
- Kirkorian, H.L., Wartella, E.A. and Anderson, D.R. (2008). Media and Young Children's Learning. *Future of Children*, 18, 39- 61.
- Kirkpatrick D. L. (1959). 'Techniques for evaluating training programs.' *Journal of American Society of Training Directors*, 13 (3): pp21–26.
- Kirkpatrick, D. L. (1994). *Evaluating Training Programs*. San Francisco: Berrett-Koehler Publishers, Inc

- Kisnawi, M. M. (2010). تلاوة القرآن الكريم وحفظه بمراحل التعليم العام, *Recitation Quran and Save Stages of Public Education*. Retrieved on November 10th, 2012, from <http://www.xn--lgbbaal6aor3mdwu7a.com/articles.php?action=show&id=129>
- Kuechler, B. and Vaishnavi, V. (2008). Theory Development in Design Science Research: Anatomy of Research Project. *European Journal of Information Systems*, 17(5), 489-504.
- Kuhl, K. P. (2000). A new view of language acquisition. *Proceedings of the National Academy of Sciences colloquium "Auditory Neuroscience: Development, Transduction, and Integration*. 19–21 May, Arnold and Mabel Beckman Center in Irvine, CA.
- Leshin, C. B., Pollock, J., & Reigeluth, C. M. (1992). *Instructional Design Strategies and Tactics*. Englewood Cliffs, NJ: Education Technology Publications
- Liang, P.-H. and Johnson, J. (1999). Using computers to enhance early literacy through play. *Computers in the Schools*, 15, 55–63.
- Luke, C. (1999). What next? Toddler netizens, playstation thumb, techno-literacies. *Contemporary Issues in Early Childhood*, 1, 95-100.
- Lykke, M. (2010). *Information Architecture and Persuasive Design: Improving Retrieval with Persuasive Strategies*. Aalborg University, eLearning Lab. Retrieved in 23rd November, 2012, from [http://vbn.aau.dk/files/57366530/OnlineConf\\_IA\\_PD\\_Dec2010.pdf](http://vbn.aau.dk/files/57366530/OnlineConf_IA_PD_Dec2010.pdf)
- Lynch Sh. A. and Warner L. (2004). *Computer Use in Preschools: Directors' Reports of the State of the Practice*. ECRP. 6(2).
- Mallon, A. A. and Zouaoui, Z. (1997). Guidelines for multimedia design and development. presented at TENCON'97. IEEE Region 10 Annual Conference. Speech and Image Technologies for Computing and Telecommunications. 2-4 December. IEEE. 839-842.
- Mat Zian N. (2009). A-maths Multimedia Courseware for Effectiveness Mathematics Learning: Matching Instruction to the Student's Learning Style. *Journal of Applied Science* 9.
- Mayer, R. E. (2001). *Multimedia learning*. Cambridge, UK: Cambridge University Press.
- Mayer, E. R. (2003). Nine Ways to Reduce Cognitive Load in Multimedia Learning, *Educational Psychologist*, 38(1), 43-52.



- Mayer, R. E. (2009). *Multimedia learning* (2nd ed). New York: Cambridge University Press.
- Mazyrah. (2009). *The Development and Usability of a Multimedia Black Cat Courseware using Storytelling Approach*. Thesis Universiti Teknologi Petronas. (Not published).
- McGriff, J. S. (2000). *Instructional System Design (ISD): Using the ADDIE Model*. Instructional Systems, College of Education, Penn State University. Retrieved on 8th March, 2013 from:  
<http://metalab.uniten.edu.my/~iskandar/project/july%2009/ADDIE.pdf>
- Media Centre. 2009. *نماء الأطفال في المراحل المبكرة*, *Children Development in the early stages*. Facts Journal, 332. Retrieved in 24th November, 2012 from  
<http://www.who.int/mediacentre/factsheets/fs332/ar/index.html>
- Merrill, D. (1999). *First Principles of Instruction*. Submitted for publication to Educational Technology Research & Developmen, Utah State University, 1-14.
- Minneapolis, MN. (2012). *Why Are Coloring Books Important for Preschoolers and Kindergarteners?* Retrieved in 2nd December, 2012, from:  
<http://www.prweb.com/releases/2012/7/prweb9725985.htm>
- Mohd Alwi, Y., Adel, M. A., and Ahmad, K. M. (2003). *Keberkesanan Iqra' sebagai kaedah pembelajaran membaca al-Quran.*, Bangi, Fakulti Pengajian Quran dan Sunnah, Kolej Universiti Islam Malaysia.
- Mohd Mahidin E.M., Umar K., Ismail S.S., Ismail R., Mohd Yusoff M.Z. (2011). *Preliminary Testing on Interactive Bahasa Melayu Reading Courseware for Dyslexic Children*. *Proceedings of the 2nd International Conference on Education and Management Technology*. 13.
- Muda, Z. & miliana Kartina Mohamed R. E. (2005). *Multimedia design and development in mathematics learning courseware for preschool education*. *Proceeding of the 2005 International Conference on Computational Intelligence for Modelling, Control and Automation, and International Conference on Intelligent Agents, Web Technologies and Internet Commerce*.
- Nagtegaal, S. and Wittens, S. (2008). *Importance Of Flashcards*. Retrieved in 26th November, 2012, from: <http://brainykids.wordpress.com/parents/importance-of-flashcards>

- Neo, A. N. (2001). Innovative Teaching: Using multimedia in a problem-based learning environment. *Educational Technology & Society*. 4, 19–21.
- Nielsen, J. (1990). Evaluating hypertext usability. In D. Jonassen & H. Mandl (Eds.), *Designing hypermedia for learning* (pp. 147-168). Berlin: Springer.
- Noordin S., Wan Ahmad W.F., Hooi Y.K. (2011). Study of Effectiveness and Usability of Multimedia Courseware Integrated with 3-Dimensional Model as a Teaching Aid. *International Journal of Computer Applications*. 16 (4).
- Nusir, S., Alsmadi, I., AL-kabi, M., and Shardqah, F. (2011). Designing an interactive multimedia learning system for the children of primary schools in Jordan. *Proceedings of the 2011 IEEE Global Engineering Education Conference (EDUCON)*, 45-51. 4-6 April, Amman, Jordan: IEEE
- O'Brien, R. (2001). *An Overview of the Methodological Approach of Action Research*. In Roberto Richardson (Ed.), *Theory and Practice of Action Research*. Brazil: University Federal da Paraíba.
- Oinas-Kukkonen, H., and Harjumaa, M. (2009). Persuasive Systems Design: Key Issues, Process Model, and System Features. *Communications of the Association for Information Systems*, 24, 485.
- Platt M.W., (2010). *The wonder years: the essential guide to child development for ages 0-5*. MPH Publishing: Kuala Lumpur.
- Plowman, L., Mcpake, J. and Stephen, C. (2008). Just Picking it up? Young Children Learning with Technology at Home. *Cambridge Journal of Education*, 38, 303-319. ERIC (30-10-2010).
- Reigeluth, C. M. and Stein, F. S. (1983). The Elaboration Theory of Instruction. In C. M. Reigeluth (ed), *Instructional Design Theories and Models: An Overview of their Current States*. Hillsdale, NJ: Lawrence Erlbaum.
- Reiser, R. A. & Dempsey, J. V. (2007). *Trends and Issues in Instructional Design* (2nd ed.). Upper Saddle River, NJ: Pearson Education, Inc.
- Rideout, V. J., Vandewater, A.E. and Wartella, A.E. (2003). *Zero to Six: Electronic Media in the Lives of Infants, Toddlers and Preschoolers*. Retrieved on 26th March, 2013 from: [www.kff.org/entmedia/upload/Zero-to-Six-Electronic-Media-in-the-Lives-of-Infants-Toddlers-and-Preschoolers-PDF.pdf](http://www.kff.org/entmedia/upload/Zero-to-Six-Electronic-Media-in-the-Lives-of-Infants-Toddlers-and-Preschoolers-PDF.pdf)
- Rosmani, A. Abdul Wahab, N. (2011). i-IQRA': Designing and Constructing a Persuasive Multimedia Application to Learn Arabic Characters. *Proceedings*

- of the 2011 IEEE Colloquium on Humanities, Science and Engineering Research*. 5-6 December, Penang: IEEE.
- Rosmani, A., Abdul Wahab N., Ibrahim N. (2012). Evaluating IQRA' Multimedia Learning Application. *Proceedings 2012 IEEE Business, Engineering & Industrial Applications Colloquium (BEIAC)*.
- Rozaimel, A., Wan Isa1, W. M., Ahmad, F., Safei, S. and Zainol, F. A. (2011). Conceptual Framework for the Development of KAFA Courseware. *Proceedings of the 2011 International Conference on Future Information Technology IPCSIT*. vol.13. IACSIT Press, Singapore.
- Ryder, M. (2011). Instructional Design Models. *The International encyclopedia of education*: Pergamon. 45 (1), 2856-2862.
- Saad R. M., Idris N., Cheong L. S., Abdul Razak A. Z., and Mohd Nor N. (2007). Evaluation of Courseware for Teaching and Learning From One Mathematics and Science. Centre for Economic Development and Ethnic Relations (CEDER), University of Malaya. MEDC. 1.
- Schweinhart, L.J, Barnes, H.V, and Weikart, D.P. (1993). *Significant benefits: The High/Scope Perry Preschool study through age 27*. Monographs of the High/Scope Educational Research Foundation. 10. Ypsilanti, MI: High/Scope Press.
- Shah, A., and Godial, S. 2005. *ICT In The Early Years : Balancing The Risks and Benefits*. Retrieved in 19th October, 2012, from <http://digitalknowledgecentre.in/files/2012/02/ICT-IN-THE-EARLY-YEARS-BALANCING-THE-RISKS-AND-BENEFITS.pdf>
- Shelov S.P., and Hannemann R.E. (1998). *Caring For Your Baby And Young Child- Birth To Age 5*. New York: Bantam Books.
- Siemens G. (2005). *Learning Development Cycle: Bridging Learning Design and Modern Knowledge Needs*. Retrieved on February 23th, 2013, from <http://www.elearnspace.org/Articles/lde.htm>
- Sinatra, G. M. and Kardash, C.M. (2004). Teacher Candidates' Epistemological Beliefs, Dispositions, And Views On Teaching As Persuasion. *Contemporary Educational Psychology*, 29, 483-498.
- Siraj-Blatchford, I., and Sirah-Blatchford, J. (2003). *More than Computers: Information and Communication Technology in the Early Years*. London: The British Association for Early Childhood Education.

- Slack, F., and Rowley, J. (2001). Observation: Perspectives on Research Methodologies for Leisure Managers. *Management Research News*, 24(1/2), 35-42
- Snuggs, C. (2008). *Learning Through Play in Preschool*. Retrieved in 3rd December, 2012, from: <http://suite101.com/article/learning-through-play-in-preschool-a60529>
- Strauss, M. (2010). How to use flash cards to help teach a child to read. Retrieved in 26th November, 2012, from <http://www.helium.com/items/1956301-teaching-a-child-to-read-with-flash-cards?page=2>.
- Tan, A. and Nicholson, T. (1997). Flashcards revisited: training poor readers to read words faster improves their comprehension of text. *Journal of Educational Psychology*, 89, 276-288.
- Taylor-Powell E, Steele S. (1996). *Collecting Evaluation Data: Direct Observation*. University of Wisconsin Cooperative Extension. Retrieved on 27<sup>th</sup> June, 2012 from: <http://learningstore.uwex.edu/pdf/G3658-5.PDF>
- Thacker, C. (2007). *Why Use Technology in Education?* Retrieved in 24th July, 2012 from <http://www.macinstruct.com/node/7>
- Thompson, R. A. and Nelson C. A. (2001). Developmental science and the media: early brain development. *American Journal of Psychology*, 56, 5-15.
- Tinajero, A. (2011). Cuba and Early Human Development The Brain and Human Development. Report prepared for the Bernard van Leer Foundation.
- Valentine G., Marsh J., Pattie Ch. and BMRB. (2005). *Children and Young People's Home Use of ICT for Educational Purposes: The Impact on Attainment at Key Stages 1-4*. DfES.
- Van Scoter, J. and Boss, S. (2002). *Learners, Language, and Technology: Making Connections that Support Literacy*. Northwest Regional Educational Laboratory. Retrieved in 21st November, 2012, from <http://www.netc.org/earlyconnections/pub/index.html>
- Wan Isa, W. M., Ahmad, f. , Amin, M., Deris, M. Rozaimée, A. Idris, W. and Safei, S. (2010). Development and Innovation of Multimedia Courseware for Teaching and Learning of KAFA Subjects. *Proceedings of the 2nd International Conference on Computer Technology and Development (ICCTD)*. p. 100-104. 2-4 November. Cairo, Egypt: IEEE.

- Yussof R.L. and Badioze Zaman H. (2009). Usability Methodology of Multimedia Courseware (Mel-Sindd) for Down Syndrome Learner. Paper presented at the *Proceeding of the 3rd International Malaysia Educational Technology Convention*, Batu Ferringhi, Penang
- Yusoff, M. F., Zulkifli, N. and Mohamed F. F. (2011). Virtual Hajj (V-Hajj) - Adaptation of Persuasive Design in Virtual Environment (VE) and Multimedia Integrated Approach Learning Courseware Methodology. *Proceeding of the 2011 IEEE Conference on Open Systems (ICOS2011)*. 25-28 September. Langkawi, Malaysia.
- Zaini Z.H. and Wan Ahmad W.F. (2011). Effectiveness and Usability Evaluation of 'Li2D' Courseware. World Academy of Science, Engineering and Technology. 50.
- Zemach, I., Chang, S., and Teller, D. (2007). Infant color vision: Prediction of infants? spontaneous color preferences *Vision Research*, 47 (10), 1368-1381 DOI:10.1016/j.visres.2006.09.024
- Zubair, K. M. (2012). *Importance of Arabic*. Retrieved on October 10<sup>th</sup>, 2012, from [http://www.khaleejtimes.com/kt-article-display-1.asp?xfile=/data/opinion/2012/August/opinion\\_August42.xml&section=opinion](http://www.khaleejtimes.com/kt-article-display-1.asp?xfile=/data/opinion/2012/August/opinion_August42.xml&section=opinion)