RELATIONSHIP AND DESIGN MODEL FOR A WEB BASED SYSTEM UTILIZING SELF-DIRECTED LEARNING

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Abstract. The pervasive use of technology in education has led changes to the learning process. Surpassing the traditional learning process, self-directed learning is gaining popularity day by day. It is the form of active learning where the learning activities for example planning and realizing the learning goals, deciding upon learning strategies, acquiring knowledge etc. are all controlled by the learner. But most research regarding self-directed learning is based upon standard educational environment. Especially as self-directed learning is more efficient in adult learners, most research is based on university level education. Thus the objective of this paper is to design a relationship and a design or infrastructural model for a web based system that utilizes self-directed learning. A web based system that will have the objective of providing resources to users to assess themselves and based on the assessment, the system will provide guidance for the users for self-improvement. So the user will be in control of his or her learning and acquiring knowledge for the self-improvement, the system will only act as a guide. As a case study the model has been applied to the Self-help Maqam-based system, an application developed based on the book Minhaj ‘al ‘Abidin’s 7 maqams or hurdles, authored by Imam Al-Ghazali (r.a) to assess a user’s spiritual level and ultimately help the user to improve at his or her own pace.

INTRODUCTION

With the ubiquitous presence of technology for the last decade more and more education and learning has changed its colors in many different ways. With the wide availability of information and knowledge, learning is moving away from teacher directed learning and towards self-directed learning. Especially for adults the efficacy of self directed learning has seen to be more prominent. As adults are more motivated by themselves to learn and are able to set and manage the learning goals without the guidance of teachers or instructors, self-directed learning is more viable for them. The combined usage of web technology and self directed learning is predominant in current research especially in the field of education and learning strategies. The objective of this paper is to design a self directed strategy platform for a system that has the objective to provide resources to users to assess themselves and based on the assessment, the system will provide guidance for the users to improve themselves.

As a case study, we have used a system entitled Self-Help Maqam-Based Search System (Othman et al., 2014) and shown how this design platform will associate self-directed learning and the self-assessment system to enhance the learning ability of the users to improve themselves. This system developed by Othman and others is a self help system containing seven maqams or states based on the book Minhaj ‘al ‘Abidin by Imam Al-Ghazali (r.a) (Othman et al., 2014). This book is considered one of most valued and respected book in the Muslim world Each maqam contains certain conditions in the form of knowledge or actions that a user needs to fulfill to cross or climb the particular maqam. The goal is to reach the seventh maqam and maintain all the required knowledge and actions to attain spiritual wisdom (Othman et al., 2014).

LITERATURE REVIEW

Taminiau and others (Taminiau et al., 2014) have designed an on demand learning environment that will allow an inexperienced learner to acquire and develop their self-directed earning skills
through advice received on self-assessment. While Siminică and Traistaru have resolved that also in economic education self-directed learning involves the learners to identify and regulate their own learning goals and skills. The learners are aware of the strategies that are required to fulfill the learning goals. So for the entire process to work, accountability is clearly an important factor (Siminică & Traistaru, 2013). Robertson in her research has shown how to enhance the educational value of blogging in a university learning atmosphere through meta-cognitive and cognitive skills of self-directed learning (Robertson, 2011). Yamagata-Lynch and others have looked into the effectiveness of collaboration between teacher led and student led graduate level instructional technology course with self-directed learning (Yamagata-Lynch et al., 2015).

Another paper also evaluated a blended method of teaching an undergraduate-nursing course where both traditional teaching with technology-based teaching was applied (Gagnon et al., 2013). It was found that the effectiveness of this blended teaching methodology depended on the level of the students’ incentive and of course their skill level of self directed learning (Gagnon et al., 2013). Warburton developed a content quiz group learning assignment that allowed the students to improve upon their question asking skills, to find resources and tools appropriate to their problem tasks (Warburton & Volet, 2013). The research revealed that students were aware of the fact that their style of studying did reflect on the quality of their learning. Waters developed a study of self-directed learning (SDL) tools that were applicable in the training of manual healthcare and osteopathy (Waters et al., 2013). This paper showed that as an example using forums would decrease the disparity between classroom and clinical education (Waters et al., 2013). Another paper by Edmondson and others has studied the association between self-directed learning and the paradigms involved in the education area (Edmondson et al., 2012). It was shown that academic performance and self-directed learning had a positive and inclining relationship, especially in business education (Edmondson et al., 2012).

Most researches done on self-directed learning are based on the premise of the education domain. Predominant research is the study of the relationship between university courses, training courses or other educational material available in educational institutions, web and self-directed learning of the students of those institutions. But this type of self-directed learning in a different set of application that is not in the context of normal educational environment has not been in the research focus. This other form of learning environment for example self improvement in self health monitoring, self learning of other skill sets through resources made available by an application etc. have not been studied that widely. These learning contexts do not fall in the standard form of intuitional education.

**Relationship Model of a System Based Self-Directed Learning**

To utilize and maximize the potential of self-directed learning, literature reviews have shown that depicting a relationship between education and learning is essential. Even though the proposed system is not the standard web based university or educational course system, but it does have a similarity context. The content of the book Minhaj ‘al ‘Abidin acts as the course content and the goal of this course is to acquire the knowledge and maintain the acts of a good Muslim. Thus a relationship model for a self-assessment system based on self-directed learning contains the following relationship items, Ability & Capacity, System Technology, Resources, Evaluation and Learner Goals as shown in Fig. No. 1.

**Figure 1. Relationship Model of a system based self-directed learning**

**System Technology**

The system technology can be varied but essentially will have some basic common components and functions. Whichever technology being used this item must have the capability of combining the resource items with assessment, evaluation and management functionality. The basic functionality is to assess any users’ capability and ability to detect the skills and knowledge available as per requirement of the learner goals. The system should also be able to identify and predetermine the learner goals.

**Current Facility and Capability**

This is the current state of the user’s knowledge capacity and different capabilities of performing certain tasks, learning capability. It is essential to have the idea of the current state of a user’s knowledge and capability, as it will allow the user to understand at what stage he is in and can set which goals he needs.
to achieve. And then as the goals are identified he can plan to achieve the set goals. Here the system can help and guide the user to assess and determine the goals. But the pace and planning are all in control of the user as per self-directed learning strategies and rules.

**Resources**

Resources can be in the form of books, web links and collected information. Feedback from the system is also part of the resource. Self-directed learning enables the user to initiate their own learning in accordance to the requirement of achieving the goals set. They can set and use their own learning strategies and at their own pace learn and accumulate knowledge. The system not only can provide the resource in terms of knowledge and information but also can guide the user to attain the appropriate knowledge for the appropriate task.

**Evaluation**

After learning the user is evaluated by the system for the purpose of reflection of what the user has acquired in terms of knowledge and skill. This helps the user to assess and reflect whether he or she is ready to apply what he has learnt to achieve the goals set. Positive assessment will drive the user towards the goals set and negative assessment will allow the user to revert back to more learning to complete the requirements. The feedback and assessment guidance takes the role of the teacher as seen in a blended leaning environment.

**Learner Goals**

Through the application of acquired knowledge and skill the user now can achieve the goals previously set. This whole process can iterate for any set of goals. Fig. 2 allows the visualization of the general activities involved in the user portion and the activities that is included in the system part. The ultimate objective both for the system and the user is the achievement of the set goals. The web based system will provide the resources for the user for learning and acquiring skills and also by evaluating the user will also provide the user with the feedback information or resource for the user to understand whether or not the user is capable of achieving the goals established.

![Figure 2. Relationship framework of a system based self-directed learning](image)

**Infrastructural Model of a System Based on Self-Directed Learning**

The infrastructural model for the system based self directed learning has been designed based on the design visualization model of Web-based Teaching and Learning Self-directed Platform (Yan et al., 2011)). This model visualizes a curriculum based web system for learning with teacher interaction. The infrastructural model shown in fig. 3 consists of three layers. The bottom layer contains the Database Management System. This Database Management System consists of the Resource Database, User Database and the Feedback Database. The resource database can contain resources such as book content,
web links and other web resources. The user database contains 
statistics. The feedback database will keep track of the user’s 
knowledge base and skill or performance level. The middle layer 
is the system platform that integrates the database and the system 
functionalities. This part allows the system to extract the resource 
in accordance to the user’s requirements. And the top layer is the 
User Interface Layer for the user to interact and use for his or her 
information regarding the user, his demographics and other 
self-directed learning and evaluation. The self-directed learning 
can be categorized by state and by time. There can be different 
states that the user can achieve while progressing towards a 
certain goal. And also learning can be quantified by the time that 
the user takes to achieve those states by self-directed learning in 
order to attain the preset goals.

![Figure 3. Relationship framework of a system based self-directed learning](image)

A Case Study: Self-Help Maqam-Based Search System Based 
on Self-Directed Learning

“Minhajul Abidin ila Jannatu Rabbul Alamin” (The Exalted Path 
of the Worshippers leading them to the Paradise of the Lord of the 
Universe), the book by Imam Al-Ghazali (RA) on Sufism guides 
all Muslims towards wisdom, to attain proximity to Allah (SWT) 
(Othman et al., 2014). According to this book one has to climb up 
through 7 maqams or hurdles, which ultimately will lead one 
towards tawassuf. Now to cross each state or hurdle one needs to 
acquire the knowledge and fulfill certain tasks with sincerity 
(Othman et al., 2014). A Self-Help Maqam-based search system 
has been developed that will guide an individual through those 7 
hurdles or maqams mentioned in “Minhajul Abidin”. It allows 
users to retrieve and acquire the relevant knowledge and 
information to attain the conditions of the hurdles or maqams. 
This system will allow the user to use self-directed learning skill 
at his or her own pace to learn the knowledge required for 
crossing the maqams and also by using the evaluation and 
feedback information, the user is allowed to fill the gaps of his or 
her knowledge and skill in order to fulfill the conditions of the 
maqams or hurdles. As the user fulfills the knowledge and 
conditions he is passed on to the next level or next maqam, 
ultimately the goal is to reach the seventh maqam.

The feedback is in the form of attributes associated with each of 
the conditions of each maqam or hurdle. After assessment of one 
maqam the user is shown the attributes that he has achieved and 
those he has not. The system will provide the user resources and 
content from the books for all those attributes that he has not 
achieved. This can be done in the user’s own pace; there is no 
time set. Using the appropriate 
attribute information form the book provided by the system, the 
user can easily gain knowledge or acquire skill. This allows the 
user to formulate his or her own strategy and pace to do so. The 
system will only act as the guide.

Fig. 4 and fig. 5 shows the application of the models in the Self-
Help Maqam-based Search System.

As shown in figure no. 4, users will use the web based Self Help 
Maqam Based system as a stand alone system or via Internet to 
assess one’s positive traits and negative traits required for each 
individual maqam starting from one in according to the book, 
Mina ‘al ‘Abidin. The system assesses an user based on users 
answers to questions or conditions for each maqam will display
the traits of the user and allow the user access to resources to improve upon those traits. Thus the user can improve their knowledge and their skill and ability in accordance to the book.

Figure 4. Relationship Model of the Self-Help Maqam-Based Search System and Self-Directed Learning

The infrastructural model shown in figure no. 5, where there is a database management system which will consist of the resources in the form of the book, user profile which is asked when the user first registers with the system and as the users answers the questions of each maqam, the answers in the form of attributes are kept to provide as a feedback to the user. The user interface utilizes the self-directed learning while the user answers and passes through the maqams and the self-evaluating module when the user is given the feedback allowing him or her to improve by using the resources provided.

Figure 5. Infrastructural Model of the Self-Help Maqam-based Search System and self-directed learning

Conclusion
The models clarify the impact of self-directed learning in any web-based system. It also helps in identifying the areas where self-directed learning is applied and how it can be used to enhance the learning experience for the user. It also helps to visualize the overall system based on which decisions can be taken in terms of where self-directed learning and blended
learning should take place and where they can be the most efficient.

REFERENCES


