

Design and Development of a Tool to determine E-learning Readiness

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Introduction

Why does an organization decide to use e-learning in their workforce training? What are the potential challenges ahead? As e-learning becomes more commonplace as a tool for workforce training, it is recognized there are varying reasons for using e-learning, chief among them being the fear of losing competitiveness (Comacchio & Scapolan, 2004). Adoption for the sole purpose of remaining competitive does not necessarily result in the most appropriate and timely interventions. As training expenditures on e-learning continue to grow, there are increased advantages for adoption among which are the ability to reach geographically dispersed employees; deliver just in time, standardized training; and reduce costs associated with training. Since the use of e-learning is growing it becomes increasingly important to determine the readiness of organizations for adoption before and even after using e-learning.

In this paper we will focus on the design and development process used in the creation of a tool to determine e-learning readiness. It begins with the initial considerations for tool development to the factors that influence the decisions made in the design and development process. The paper also outlines some of the limitations encountered in the research journey that determined the methodology, design and final development of the tool.

Initial consideration in designing this tool was to determine from the onset what type of analysis would be necessary to determine e-learning readiness. Tessmer (1990) recommends two areas for consideration when designing instructional systems; the instructional environment and the support factors influencing the instructional environment. In undertaking an e-learning project some sort of needs analysis should be undertaken. Tessmer (1990) emphasizes the need for conducting an environmental analysis early in the project design since an understanding of the environment could guide later decisions. The environment refers not only to the physical environment but also related culture and climate. From an instructional design perspective, a learner and context needs analysis is usually included in course design, but e-learning represents an institutional-wide learning initiative and therefore a more encompassing analysis is needed.

This research is based on the premise that a type of needs analysis is necessary before establishing e-learning within an organization. Having established the need for an upfront analysis, four (4) existing models for e-learning readiness were explored (Aydin & Tasci, 2005; Borotis & Poulymenakou, 2004; Chapnick, 2000; Psycharis, 2005) as examples of types of analysis tools. The four models included several similarities and variations in the aspects of e-learning that were important for consideration before establishing e-learning. A breakdown of each tool is seen in Table 1.

Table 1. Summary of E-learning readiness tools

| Aydin & Tasci (2005) | Chapnick (2000) | Borotis and Poulmenakou (2004) | Psycharis (2005) |
|--|--|---|--|
| <ol style="list-style-type: none"> 1. Technology <ul style="list-style-type: none"> - Access - Learner skills and attitudes 2. Innovation <ul style="list-style-type: none"> - Barriers - Adoption - Openness 3. People <ul style="list-style-type: none"> - Employees - HR Specialists - E-learning champion - Vendors and external parties - Skills with respect to learning with technology 4. Self-Development <ul style="list-style-type: none"> - Budget - Time management - Belief in self-development | <ol style="list-style-type: none"> 1. Psychological 2. Technical Readiness 3. Environmental 4. Human resources 5. Sociological 6. Economic 7. Financial 8. Equipment 9. Content | <ol style="list-style-type: none"> 1. Business 2. Technology 3. Content 4. Training process 5. Culture 6. Human Resources 7. Financial | <ol style="list-style-type: none"> 1. Resources <ul style="list-style-type: none"> - Technology - Financial - Human Resources 2. Education <ul style="list-style-type: none"> - Content - Educational 3. Environment <ul style="list-style-type: none"> - Entrepreneurial - Culture - Leadership |

Source: p. 16, James-Springer (2016).

Every tool referred to the need to consider: organizational readiness in the categories of organizational culture, human resources, and financial resources; learner readiness in areas such as learner characteristicsequipment readiness that covers infrastructure as well as readiness with reference to the operation of the equipment. For these tools, similarities were identified in broad headings, but there were variations in how the authors interpreted the categories within these headings; for example what Aydin and Tasci (2005) classify as self-development what can be easily categorized as learner self- efficacy and motivation, this same concept would fall under human resources in Chapnick’s (2000) and Borotis’s and Poulmenakou’s (2004) models. These variances provided a basis for the designing and developing this new tool for e-learning readiness.

Methodology

The study uses Design and Development (D&D) research methods that cross both model development and tool development, as defined by Richey and Klien (2007). A summary of the process and their resulting outputs are shown in figure 2.

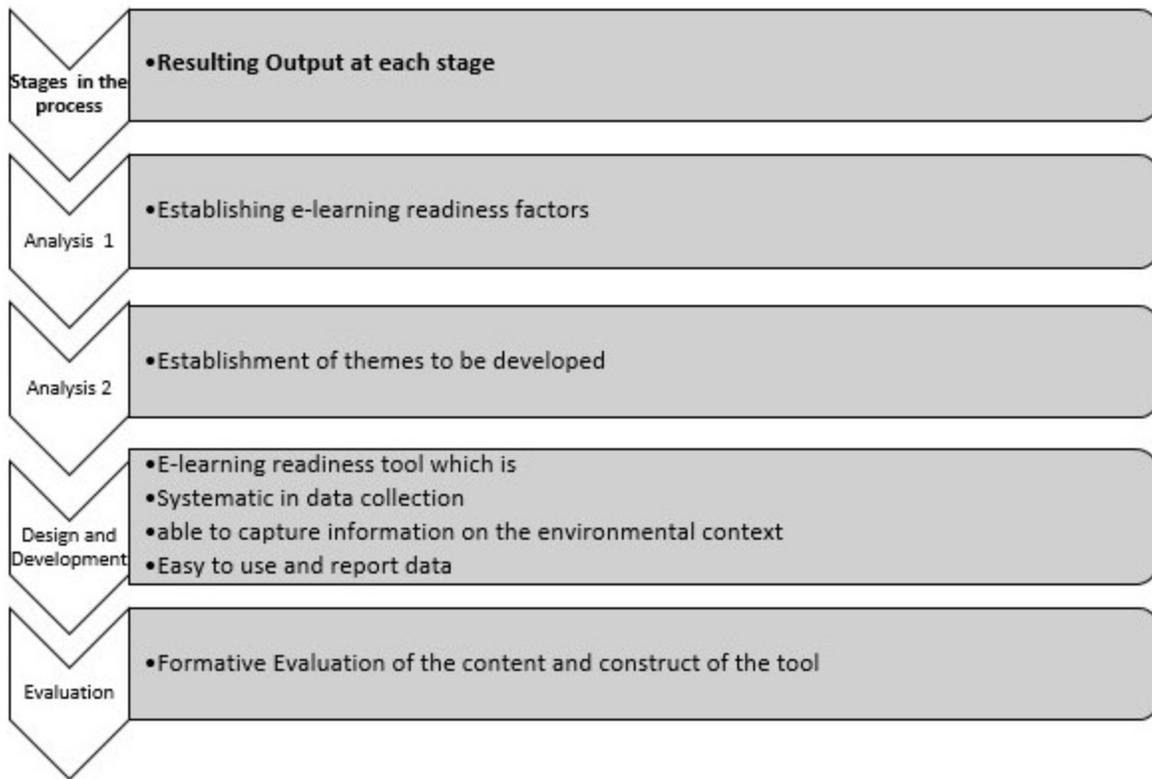


Figure 2. Stages in the design and development process and resulting outputs

In this research, two phases of analysis occurred, and the results of these analyses informed the design and development decisions.

Analysis Phase 1 involved a review of four existing e-learning readiness models, chosen on the basis of their frequency of use in e-learning literature, which resulted in a preliminary list of factors required for e-learning readiness.

Analysis Phase 2 involved a review of multidisciplinary literature to create themes. The literature used in this phase evolved as a result of questions raised during the preliminary review of the e-learning models. Nunamaker, Chen, and Purdin (1990) recommend that in information systems development, it is necessary to go beyond the discipline to obtain ideas for the design. Exploring other literature provided insight into ways of varying the tool, and facilitated application of content from fields such as learning and innovation principles within organizations, knowledge management, adult learning theory and technological support systems. These areas viewed in isolation have little in common with e-learning but the concepts proved useful in bringing the various aspects required for determining e-learning readiness.

Design and Development

The second phase involved the application and embedding of theoretical knowledge (Van den Akker et al., 2012) in the design and development of a tool that was practical and usable in real world settings. The tool was designed and developed to capture information on:

- Specific parameters for determining e-learning readiness
- Systematic processes for coming to conclusions on readiness
- Capturing concerns about the environmental context
- Interrelatedness of the overall implementation process

Development

The tool was developed to incorporate factors identified as important in existing e-learning literature. Seventy six (76) sources of literature were examined and coded based on the themes identified in the second analysis phase. These comprised empirical qualitative and quantitative studies, business publications, and books. From the e-learning literature, several features were found to be associated with e-learning adoption; for example the need for learning to be a part of general organizational practice; positive attitudes toward using technology for learning at all levels within the organization; and an accessible and quality system. These features reoccurred as favoring easier implementation and acceptance of e-learning. Therefore questions pertaining to these finding were included in the tool. The development process resulted in four survey instruments, each of which focused on different target groups within the organization: (A) leadership survey, (B) human resources survey, (C) learner analysis survey, and (D) technology survey.

The leadership survey (A) has two target groups: top management and mid-level management. The basis for these targets was the acknowledgement that adoption of e-learning is a change and any change must be supported by leaders within the organization (Annansingh & Bright, 2010; Purnomo & Lee, 2013). The distinction in management was also important since mid –level managers would be able to provide more detailed information on every day running of the organization.

The human resource survey (B) is meant to gain opinions from the individuals who are supposed to know where knowledge lies in the institution and the learning needs of the organization.

The learner analysis survey (C) targets employees that would be presumed to actively use and interact with e-learning. The literature recognizes that several employee characteristics can contribute to e-learning success and chief among them is self-efficacy, (Womble, 2008). The survey looks to gather learner perceptions regarding various aspects of readiness including organizational support, learning culture, learner access and attitudes.

The technology survey (D) targets the individuals who are responsible for facilitating the use and acquisition of computer technology within the organization.

The final aspect of the tool serves to collate the information gathered from the four surveys into as succinct document that can be used for decision-making. It is in the form of a final checklist and recommendations (E). The process is outlined in figure 3.

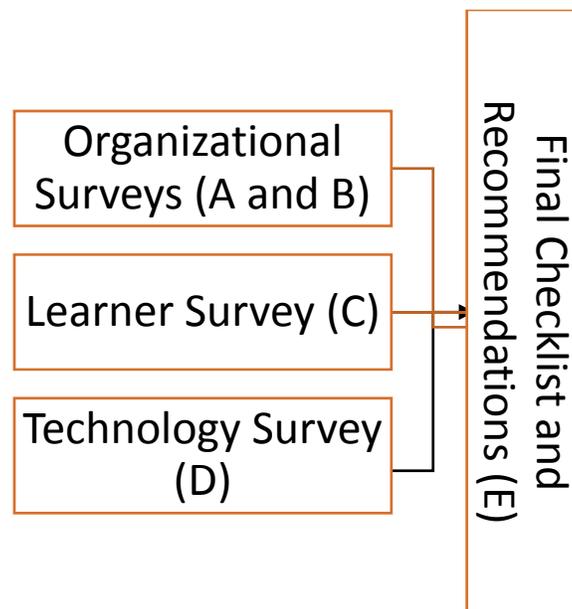


Figure 3. The process of using the e-learning analysis tool

Source: James-Springer (2016)

Evaluation

Formative evaluation was conducted throughout the development process to determine the quality, efficiency and effectiveness of the tool (Van den Akker, Branch, Gustafson & Plomp, 2012). This was done through use of two types of experts who looked at construct and content validity of the tool separately. This phase of the research study revealed both strengths and weaknesses of the tool. Feedback was consistent in terms of the tool as practical and usable, which would capture relevant information. However, suggestions were to decrease the technical nature of the questions, and tailor some of the surveys for each target audience. This included carefully considering the self-efficacy of the information technology personnel and adding questions that would capture the idea of the personal learning culture of the individuals taking the surveys. These changes were taken into consideration in the final iteration of the tool.

Findings

The findings from this design and development study showed that it was difficult to separate this developmental research into the distinct categories of model or tool research. Tool research is context specific while model research is general (Richey & Klien, 2007), yet, this research resulted in a tool which is generalizable to various contexts. The deviation from tool design research also included a move from using case studies, as suggested by Richey and Klien (2007), and focused on gathering information from various contexts within the e-learning literature. This review of the literature resulted in a more generalizable final tool.

In the absence of clear guidelines for tool research in Richey and Klien (2007), it was necessary to look beyond IDT for guidelines in tool design. This procedure was informed by other disciplines. The methodology for this research drew on the works of Ellis and Levy (2010) and Nunamker et al. (1990) which featured information systems design approaches to tool development. Thus, the resulting methodology was an amalgamation of methods from IDT and computer systems design (Ellis & Levy, 2010).

Design and development research allows for flexibility of procedure (Van den Akker et al. 2010; Richey & Klein, 2007). At any time during this design and development, there was a focus on more than one variable. Early on in the research process, it was recognized that separation of the variables would have been difficult due to the interrelated nature of the factors affecting e-learning. Several themes were identified in the literature, these themes were related in many areas. For example, learning organizational culture is an aspect which affects every individual in an organization, whether it is creating the environment for learning or benefiting from this environment. The learning culture also affects the processes used in supporting learning within the organization. The idea of learning culture is interrelated with organizational readiness, learner readiness and technology readiness.

The artifact created in this D&D research is specifically designed to collect data within organizations from multiple perspectives. Much of the literature represented views of individual groups within organizations on the readiness of the organization; for example, Annansingh and Bright (2010) interviewed leaders within an organization and their perspectives and assumptions were used to determine e-learning readiness. The limitations of this approach resulted in the idea of targeting several groupings within an organization. Additional findings of the literature review were that the existing tools did not have an efficient way of collating data. Survey E serves this function and provides an efficient and succinct way of presenting information in the tool designed.

Conclusions

The artifact created looks at e-learning readiness in a systematic and interrelated way. The end product produced a tool intended to capture the content necessary for making decisions on e-learning readiness while at the same time being practical in application and use. Organizations show unique characteristics, and therefore, developing a general tool to determine e-learning readiness posed some challenges. Questions had to be carefully selected so that they can apply to most settings. There was also difficulty in keeping the design and the development process separate at some points in the research, since many decisions overlapped and influenced each other. The process used to come to the final product resulted in the amalgamation of various methodologies for tool development, these consisted of both IDT processes as well as Information systems processes.

Design and development research speaks to inclusion of several variables at once (Van den Akker *et al.*, 2012; Richey & Klien, 2007) and this research was no exception. The design of the tool itself reflects the interrelatedness of the variables and should help influence e-learning adoption decisions. Overall the tools should collect data from various sources within and organization in order to give a comprehensive view of the degree of

readiness within the organization. As much as possible it was designed to be easily used to collate and compare information gathered.

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