

# Investigating the necessity of having digital repositories in post-basic education in Oman

## Authors

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## Abstract

E-Learning is a method of delivering educational experiences through computers and internet networks in a multi-source interactive learning environment. As a result, the teacher can support and assist the learner at any time, whether synchronously or asynchronously, and thus departs from the concept of the teaching and learning process being limited within the classroom walls. The problem of e-learning accessibility in any educational community appears and grows over time, especially as the community's stock of knowledge grows, necessitating the availability of that knowledge in all of its forms to the beneficiaries (knowledge repository), as well as a mechanism that allows everyone to safely access that knowledge and make the most of it in order to achieve the desired learning outcomes, improve them, and bring them to the highest level of achievement. The current study sought to investigate the necessity of having digital repositories in post-basic education in Oman, to provide students with different learning experience using interactive e-learning content. A questionnaire was conducted for 50 teachers in the Sultanate of Oman to find out the extent of their need for having digital repositories for the post-basic education stage. The results shows that most teachers (81.53%, Mean= 4.11) agree to establish a digital repository. Finally, the study suggested a model for developing the digital repositories for teachers and students in Omani schools.

**Keywords:** Digital Repositories, Post-Basic Education, Omani schools

## 1. Introduction

E-learning is a term that refers to teaching methods that use modern communication mechanisms such as computers, networks, multimedia, search mechanisms, electronic libraries, and Internet portals, whether remotely or in the classroom. E-learning is the delivery of educational content, including explanations, exercises, interaction, and follow-up, in part or in full, in the classroom or remotely via advanced computer programs or the Internet. It also refers to "the use of technology to create, deliver, and facilitate learning at any time and from any

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location. It can refer to things like education, training, or knowledge management. (Dakroury, 2008)

Making electronic content available in a comprehensive and well-organized manner is one of the factors that contribute to the success of e-learning in achieving its objectives. As a result, establishing digital repositories with large number of learning objects is critical. Teachers and students can access these repositories to ensure that learning objectives are met.

For any knowledge society, a Digital Repository (DR) is a system that collects, preserves, manages, and provides access to intellectual property products. Text, audio, visual, or multimedia content, as well as interactive content, are examples of intellectual products. These repositories contribute to a variety of added-value services for any intellectual or educational community. See figure 1.

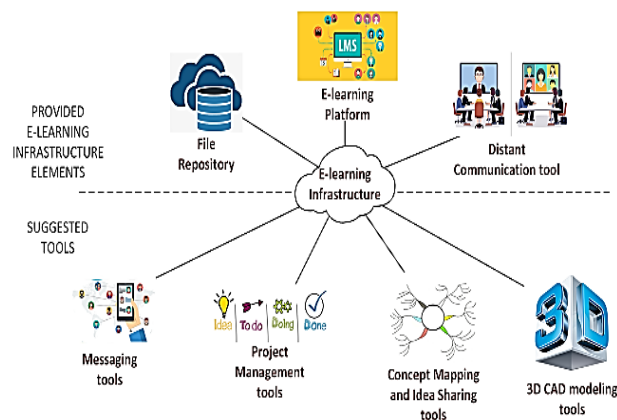


Figure 1 E-learning infrastructure with the integration of platform repository and tools (Becattini et al., 2020)

Figure 1 depicts the critical role of digital repositories in the e-learning infrastructure in enhancing the teaching and learning process by providing necessary educational materials in the form of learning objects.

However, many educational systems ignore including digital repositories in their e-learning infrastructure related to their own curriculum. It is also the case in Omani schools except some trials to provide digital content for learners but with no visible impact.

The current study focuses on the post-basic education stage, as it is the most pivotal stage in the student's educational journey before joining university education, and it needs a special and very tight preparation regarding the pattern of content presentation and its availability for use, as after the completion of this phase the student will enroll in university education, which is completed in it, the content is presented and made available in a completely different way from the previous stage, and in order to reduce this gap, it is necessary to seriously think about keeping pace with the patterns of presentation and availability of educational content in those two stages on a closely related context and approach.

Thus, the current study is trying to explore the need for having a dedicated digital repository that serve the Omani curriculum in the post-basic education stage.

## 2. Literature

### 2.1 E-Learning concept

There are many definitions for the concept of E-learning, one of its definitions is According to U.S. Department of Education, E-learning refers to learning and teaching activities that take place primarily on the Internet and make full use of the learning environment, including new communication mechanisms and rich resources made available by modern information technology, in order to achieve a completely new mode of learning. (Liu, 2010), (Bramorska, 2021)

Also, (Alanazi & Abbod, 2014) argued that e-learning is the use of new multimedia technologies and the internet to improve learning quality by facilitating access to resources and services.

E-Learning is an inevitable necessity that the educational work does not advance without it, as the rapid development of knowledge and technology has affected the organizations and bodies of society, and has led to the need to search in the educational field for the best ways and methods that help learners learn, and provide an interactive educational environment and that suits the needs of learners in the twenty-first century And it helps them develop their capabilities, so that they are able to deal with the changes of this era.



Figure 1 Advantages of E-Learning E learning Benefits Infographic,2016, <https://elearninginfographics.com/7-elearning-benefits-infographic/>.

There are many advantages to e-learning, as Figure 1, as it depends on the method of delivering electronic information and educational lessons, as electronic media are used in communication, receiving data, acquiring skills, and interaction between the teacher and the learner, and between the learner and the school, and it may be between the teacher and the school as well, and this style of learning is not required the existence of classrooms and educational buildings, but it eliminates most of the material components of education and we can describe it as virtual education with its educational means and realistic with its results. (Crabtree, 2020)

Although there are many benefits for e-learning numerous issues should be considered during the design of an e-learning model. The following eight dimensions should be considered with the e-learning environment according to (Khan, 2001) see figure 2.

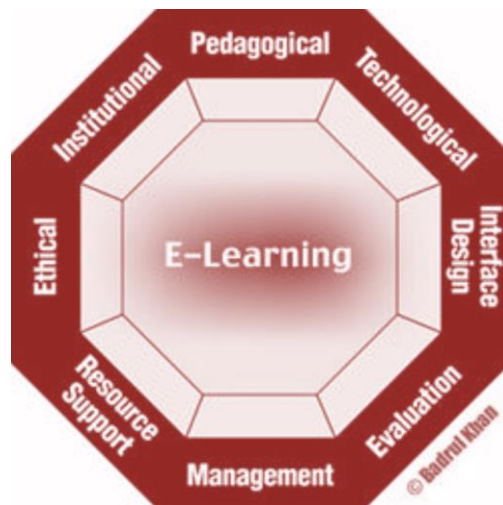


Figure 2 E-Learning Framework Consideration Issues (Khan, 2001)

**1. The institutional dimension** is concerned with issues of administrative affairs (e.g., organization and change, accreditation, budgeting, and return on investment, information technology services, instructional development and media services, marketing, admissions, graduation, and alumni affairs); academic affairs (e.g., faculty and staff support, instructional affairs, workload, class size, compensation, and intellectual property rights); and student services (e.g., pre-enrollment services, course and program information, orientation, advising, counseling, financial aid, registration and payment, library support, bookstore, social support network, tutorial services, internship and employment services, and other services) related to e-learning.

**2. The pedagogical dimension** of e-learning refers to teaching and learning. This dimension addresses issues concerning goals/objectives, content, design approach, organization, methods and strategies, and medium of e-learning environments. Various e-learning methods and strategies include presentation, demonstration, drill and practice, tutorials, games, storytelling, simulations, role-playing, discussion, interaction, modeling, facilitation, collaboration, debate, field trips, apprenticeship, case studies, generative development, and motivation.

**3. The technological dimension** of the model examines issues of technology infrastructure in e-learning environments. This includes infrastructure planning, hardware, and software.

**4. The interface design** refers to the overall look and feel of e-learning programs. Interface design dimension encompasses page and site design, content design, navigation, and usability testing.

**5. The evaluation for e-learning** includes both assessment of learners and evaluation of the instruction and learning environment.

**6. The management** of e-learning refers to the maintenance of learning environment and distribution of information.

**7. The resource support** dimension of the model examines the online support (e.g., instructional/counseling support, technical support, career counseling services, other online support services) and resources (i.e., both online and offline) required to foster meaningful learning environments.

**8. The ethical considerations** of e-learning relate to social and cultural diversity, bias, geographical diversity, learner diversity, information accessibility, etiquette, and the legal issues (e.g., policy and guidelines, privacy, plagiarism, copyright).

Advances in information technology and new developments in learning science provides opportunities to create well-designed, learner-centered, engaging, interactive, affordable, efficient, easily accessible, flexible, meaningful, distributed, and facilitated e-learning environments (Khan, 2001) but many problems appear in the educational community, especially when the stock of knowledge in this community increases, which requires the availability of this knowledge in all its forms to the beneficiaries and a mechanism that allows everyone to safely access that knowledge, and to make the most of it to achieve the targeted learning outcomes, but to improve them and bring them to the highest academic levels. And this can be achieved through specialized digital repositories.

## **2.2 Concept and importance of digital repositories**

There are numerous definitions of digital repositories in the literature and research. They can be defined according to their relevance or the way they work. Starzyńska & Klembalska (2021) defined a digital repository as a storehouse that stores and manages content and digital properties in order to facilitate search and retrieval processes for later use, with techniques that aid in the import and export process, as well as storage and preservation of these digital properties.

A digital repository, according to the Library of Congress, is a location where digital data is stored in collections. For storing digital information entities, it is also known as "digital archives," and includes digital materials such as audio recordings, texts, images, photographs, and animation. (Addy, Falbo & Xu, 2021), (Betański, 2020)

Digital repositories are considered one of the most important tools that universities and some academic and research institutions seek to possess, as these repositories are based on the management and preservation of the intellectual assets of the educational institution. The repository contains a wide range of materials that can be used to support the educational and administrative processes. From here, the significance of repositories in these institutions is assessed in terms of their function, which includes serving researchers, librarians, teachers, and students.

When discussing the importance of repositories for students, we find that they assist them in storing and retrieving information as well as making their work available to others both inside and outside the institution while respecting intellectual property rights. It promotes the open sharing of research results. It also allows researchers and students to keep track of research ideas and increases the likelihood of benefiting from intellectual works, as research and studies that are freely available are more likely to be cited than those that are not.

When discussing the importance of digital repositories for educational institutions, we discover that they can better manage educational and research resources. The significance of the repository for libraries stems from the fact that libraries play a key role in the repository preparation process because they are responsible for the beneficiaries and have knowledge and experience with their needs. By meeting the needs of the recipients of information and services, digital repositories assist in meeting the requirements of the digital age. (González, 2021), (Peñafiel, 2021)

### **2.3 Advantages of digital repositories:**

By making educational content available to beneficiaries, digital repositories provide the ability to measure the usage rates of the available materials, which means that indicators showing the times of use and the number of downloads for any mod of the repository resources are available. Digital repositories are a way to make materials available that can't be shared through traditional channels like multimedia (audio, images, video). (Kampa & Patra, 2020), (O'Neill et al., 2020)

Digital repositories are characterized by "interaction" as they can exchange information with the systems of other institutions. They also focus on teaching learners' technological skills, such as Internet browsing, research, and discovery, as well as lowering long-term expenses and costs, especially when a large amount of content is deposited. (González, 2021), (Abobala, 2021)

### **2.4 Obstacles to employing digital repositories in the Sultanate of Oman**

The most difficult aspect of the communications and information revolution is adjusting to the rapid changes. This revolution must educate society about the current needs in order to improve learning. From my perspective, the belief that change is possible is what makes it difficult. However, it is necessary to question and find convincing justifications that help to implant the conviction of change in any matter, which would improve reality.

There is a start in the Sultanate of Oman, specifically in the area of digital repositories, but it is lacking in construction, design, and thought, as well as a lack of commitment to quality standards. Great strides have been made, but more must be made to keep up with what the rest of the world is doing in terms of providing free access to information. In developed countries, providing digital repositories for school students has become a key criterion for assessing a government's educational policies.

There are number of challenges that the Sultanate of Oman faces as a result of its reluctance to widely use digital repositories in the teaching and learning fields, and when discussing them, we will concentrate on a few basic points that can be used as a starting point for understanding the weakness of employment thus far:

- The importance of free access to information through digital repositories for school students is not well understood by the educational community. In the case of a digital

repository that provides all education workers with their needs of various educational resources, the authorities or professionals should pay attention to highlighting the extent of their importance and benefiting from the outputs of the intellectual production of teachers, students, and all educators, including supervisors, administrators, and experts in the curricula, and knowing the extent to which they achieve in reducing costs, time, and effort.

- Failure to develop an implementation plan as part of the Sultanate of Oman's education strategy for creating an environment that is interactive, participatory, continuous, and cumulative, as well as allowing free access to open-source information for school students, such as digital repositories, that would enhance intellectual production and help disseminate it while respecting intellectual property rights.
- The scarcity of digital learning objects and resources inspires the creation of a digital repository with high competencies.
- Being satisfied with existing solutions for separate databases, each of which is designed for a different purpose.
- A lack of understanding of the importance of employing 21st-century skills in order to create a generation capable of creativity, innovation, critical thinking, participation, interaction, discovery, and positive digital citizenship, as well as technical skills in dealing with e-learning environments.
- Not benefiting from neighbouring countries' experiences.

In light of the previous, and in the context of the global consensus on the existence of these repositories in all educational institutions of various educational levels, and in light of the severe and increasing need for digital educational content for the post-basic education stage in educational institutions in the Sultanate of Oman, researchers have assured the need to research the extent of designing and developing a digital repository that contains the knowledge and educational production related to the study materials at that educational stage, this content is designed based on the concept of Learning Objects that present the content in an integrated and stand-alone manner (multimedia, activities, exercises, continuous self-evaluation, and other Elements).

Current researches indicate the need to design and develop learning objects so that they are consistent with the nature of the educational content of the study materials at post-basic education stage, and to achieve the intended learning outcomes for each of those subjects, and to emphasize that these objects reflect the concept of interaction between the student and the content, by providing content in a different style and different from the recognized traditional pattern, where the content presentation style encourages all students to interact with it through processes of analysis, interpretation and extraction of targeted knowledge, with the provision of activities and exercises that complement the learning process, and the presence of a wide scope for self-evaluation of the learning level of each student after the completion of learning each object .

### **3. Methodology**

#### **3.1. Participants**

The current study used a descriptive approach to investigate the need for establishing digital repositories in Oman's post-basic education. To do so, fifty instructors were chosen at random to learn about their viewpoints on using digital repositories in teaching and learning.

#### **3.2. Research tool**

The researchers created a questionnaire to gather information from teachers regarding the importance of having a digital repository. The questionnaire was designed using five-point Likert scale. To test the questionnaire's validity, experts in the field were consulted. The survey was piloted on five instructors with varied years of experience to ensure its validity. The Cronbach alpha coefficient of the scale was found to be (0.83), suggesting that it is reliable.

### **4. Results and Discussion**

A questionnaire was conducted for a random sample of fifty teachers in the post-basic education stage to measure the need for having digital repository from the teachers' point of view.

Table 1 Teachers' perspectives about the need for digital repository



	1-Strongly Disagree	2- Disagree	3-Neutral	4- Agree	5- Strongly Agree		
Statement	SD	D	N	A	SA	Mean	STDV
A digital repository is needed for making sources of information available to all without any restrictions or conditions.	7%	15%	6%	29%	43%	3.83	1.35
A digital repository is needed to increase the growth of teachers' and students' knowledge.	5%	19%	16%	39%	21%	3.41	1.20
A digital repository is needed to increase students' achievement.	13%	17%	10%	41%	19%	3.33	1.35
The availability of digital repository will reduce time and effort for teachers.	3%	11%	4%	41%	41%	4.03	1.13
If available, the digital repository will actively contribute to the spread of digital culture.	1%	7%	6%	37%	49%	4.23	1.12
If available, the digital repository will promote teachers' technological skills.	3%	5%	4%	35%	53%	4.27	1.04
If available, the digital repository will promote students' technological development.	1%	7%	7%	56%	29%	4.26	1.00
Digital repositories are required to meet the needs of teachers and students of information about curriculum.	5%	2%	3%	49%	41%	4.22	1.04
Using a digital repository will increase teachers' performance.	7%	7%	6%	59%	21%	4.02	1.27
Teachers need to have digital repository that contains learning objects related to curriculum.	6%	2%	7%	52%	33%	4.18	1.12
Digital repositories can provide students with good learning experience.	1%	1%	2%	77%	19%	4.66	0.72
It is expected that teachers and students use the digital repository in case it is related to curriculum they teach.	5%	3%	7%	58%	27%	4.25	1.11
Digital repositories can enhance the curriculum with digital content.	1%	1%	3%	81%	14%	4.61	0.73
If available, a digital repository can help students to easily understand abstract concepts	3%	1%	6%	67%	23%	4.46	0.93
If available, a digital repository can help students to increase their self-learning skills.	10%	7%	14%	45%	24%	3.82	1.35

Generally, it is clear from the results that most teachers 81.53% (M=4.11) believe that digital repositories are needed in their schools, and there is a necessity of establishing them. Their responses presented in table 1 shows the following:

96% (M=4.66) of teachers reported that digital repositories can provide students with good learning experience, 95% (M=4.61) of them stated that digital repositories can enhance the curriculum with digital content, while 90% agreed about the following: if available, a digital repository can help students to easily understand abstract concepts (M=4.46) and they are required to meet the needs of teachers and students of information about curriculum (M=4.22).

Also, 88% (M=4.27) of the teachers reported that if the digital repository is available, it will promote teachers' technological skills, and 86% (M=4.23) stated that the digital repository will actively contribute to the spread of digital culture, 85% of them agreed about the following: the digital repository will promote students' technological development (M=4.26), it is expected that teachers and students use the digital repository in case it is related to curriculum they teach (M=4.25), and teachers need to have digital repository that contains learning objects related to curriculum (M=4.18). Also, 82% (M=4.03) of them agreed that the availability of

digital repository will reduce time and effort for teachers. And 80% (M=4.02) of them reported that using a digital repository will increase teachers' performance.

Moreover, 72% (M=3.83) of the teachers reported that a digital repository is needed for making sources of information available to all without any restrictions or conditions, Also, 69% (M=3.82) of them agreed that a digital repository can help students to increase their self-learning skills, and finally 69% reported the following: A digital repository is needed to increase the growth of teachers' and students' knowledge (M=3.83), and a digital repository is needed to increase students' achievement (M=3.33).

The findings point to the need for a digital warehouse model that can achieve the required goals for educational institutions in light of modern technology, as well as a variety of other objectives including:

- Provide unrestricted access to digital content to the greatest number of beneficiaries possible.
- Encourage members of any intellectual or educational community to share their knowledge.
- Establishing the idea of pluralism and diversity in the targeted knowledge sources.
- Protecting the intellectual property of knowledge resource owners and encouraging them to participate more.
- Overcoming geographical and temporal barriers to knowledge access.
- Access to renewable and modern resources in all scientific disciplines.
- Preserving the intellectual/ cognitive production and facilitating reference and access to it at any time and from any location.
- Ease of publication and digital availability of any intellectual productions not bound by traditional (printed) publishing methods.

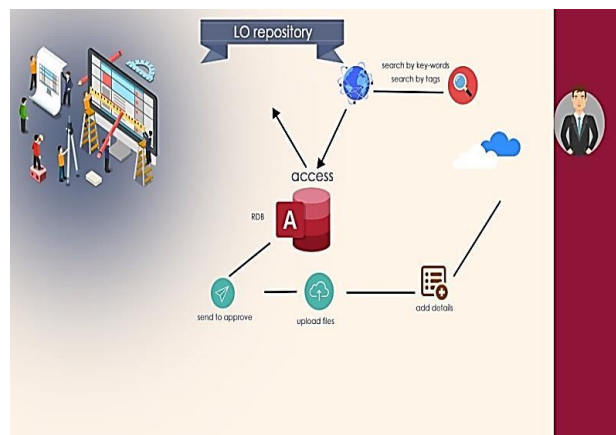


Figure 3 A suggested model for digital repository for post-basic education in Oman

Figure 3 shows a suggested model of the digital repository for teachers, which is a store that contains all the needed files to store educational content for students where learning objects are searchable by detailed metadata, and teachers can create their own accounts to add their own learning objects as well.

Perhaps the most prominent tools that the teacher need in the proposed model can be:

- Create an author account.
- Having a friendly-user interface.
- The availability of guiding wizard to effectively use the repository.
- Adding detailed metadata that can help in the search and retrieval processes.
- The ability to download learning objects from the digital repository.
- The ability to view learning objects online.
- The ability to upload learning objects to the digital repository.

## 5. Conclusion

Rapid technological advancements in our current era have aided the development of many advanced systems for e-learning and distance learning, which have influenced how people find, circulate, and use information for educational purposes. Digital repositories are one of these systems that can hold a wealth of information and tools for achieving educational objectives. Furthermore, these repositories can contain a variety of digital learning elements, resulting in a complete educational environment in which these elements can be easily reused in various educational situations based on the needs of each situation. The implementation of this work aims to contribute to the development and modernization of the educational content of this important educational stage based on a thorough review and analysis of the relevant regional and global experiences.

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