Digital Competencies Required for Information Science Specialists at Saudi Universities

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Summary

The objectives of this research were to identify the digital competencies required for information science specialists at Saudi universities and to examine whether there existed conspicuous differences in the standpoint of these specialists due to years of work experience with regard to the importance of these competencies.

A descriptive analytical method was used to accomplish these objectives while extracting the required digital competency list and ascertaining its importance. The research sample comprised 24 experts in the field of information science from several universities in the Kingdom of Saudi Arabia. The participants in the sample were asked to complete a questionnaire prepared to acquire the pertinent data in the period between January 5, 2021 and January 20, 2021.

The results reveal that the digital competencies required for information science specialists at Saudi universities encompass general features such as the ability to use computer, Internet, Web2, Web3, and smartphone applications, digital learning resource development, data processing (big data) and its sharing via the Internet, system analysis, dealing with multiple electronic indexing applications and learning management systems and its features, using electronic bibliographic control tools, artificial intelligence tools, cybersecurity system maintenance, ability to comprehend and use different programming languages, simulation, and augmented reality applications, and knowledge and skills for 3D printing. Furthermore, no statistically significant differences were observed between the mean ranks of scores of specialists with less than 10 years of practical experience and those with practical experience of 10 years or more with regard to conferring importance to digital competencies.

Key words:

Digital Competencies; Information Science; Information Science Specialist; Higher Education; Saudi Universities

1. Introduction

Information plays a vital role in the different facets of life in the contemporary world that deems information as power. Digital and informational skills refer to the capability to define the digital information required in terms of its organization and the best sources of access to it and the ability to critically evaluate it and share the same digitally [31]. All these digital skills associated with information constitute the so-called “digital literacy,” which has garnered tremendous attention in recent years because of the increase in reliance on the Internet and digital resources in acquiring and processing information.

With regard to digital literacy, a multitude of terms and definitions have emerged to describe it; however, most of them relate to information and communication technology (ICT) skills and how to master and deal with them adequately to attain digital competency. In straightforward terms, digital competency is defined as the skill to use multifarious technologies to obtain, create, manage, evaluate, and share information digitally using digital tools [20].

A number of researches have already examined the concepts of modern data, big data, information mining, etc.; however, only a few have appraised the impact of these trends in the field of information science, with which one must keep up so as to not encounter, for example, many digital libraries and digital data, and a dearth of qualified information science experts capable of dealing with challenges that require specific competencies and critical requirements in dealing with this digital information [23]; [27].

[30] remarked that information science specialists face countless challenges related to disseminating information and making it available for the development of societies, and therefore, in addition to their responsibilities in technical jobs, they must provide advice, create practical applications, and provide guidance to beneficiaries. The library and information science (LIS) specialists are also sought for the development of their scientific and professional competencies to keep pace with futuristic technological developments in the prevailing digital environment, because future challenges in the specialization related to the unification of specializations

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and sciences rather than just their development and fragmentation.

The last three decades have witnessed notable modifications in the concepts and functions of LIS specialists in Arab countries, as those concerned, demanded development of the profession scientifically, professionally, and technically with the aim of making it more flexible, vibrant, and up-to-date by qualified and trained information specialists and workers and accentuated the importance of preparing specialists who possess basic scientific and technical knowledge as it defines the indispensable competencies [34].

Therefore, employees, in general, have to engage in lifelong learning and acquire new skills and competencies to adapt to the rapidly increasing demands of the work environment [2] ; [12] and [13]. Indeed, a gap was detected between the existing and desired digital competencies of the workforce [11] and [19].

[5] stated that digital competency does not only contain basic skills such as searching for information online, but also more advanced abilities, such as analysis, explanation, and application of the information in relevant real-life contexts.

The digital competencies can be defined as the "ability to understand and express by making analytical, productive and creative use of the information technologies and social software to transform information into knowledge" [32].

[28] defined digital competencies as the synthesis of knowledge, skills, and attitudes, and referred to the same as "the confident and critical use of Information Society Technology for work, leisure and communication."

[15] mentioned that the development of digital competencies and information literacy has been slow-moving in comparison to the expeditious advancements in ICT, and this remains an issue for the higher education sector.

If specialists in LIS are not able to keep pace with the accelerating reforms in the nature of digital data and adopt the methods of dealing with the same, there is anticipated to be a discernible gap between the skills available to them and the skills essential for this specialization and what the labor market demands, as it is necessary that the persons designated in information science in the Kingdom of Saudi Arabia are qualified with information literacy competencies to make the most optimal utilization of information resources.

Therefore, this paper illuminates the roles and functions that differed in the field of information science because of the great digital transformation that has conspicuously impacted most fields, including the field of information science. In particular, this investigation was guided by the following research questions:

1. What are the digital competencies required for the information science specialists at Saudi Universities?
2. Does the specialists' assessment regarding the importance of digital competencies required for information science specialists at Saudi Universities differ according to work experience (less than 10 years/10 years or more)?

2. Theoretical Consideration

The expeditiously growing technological revolution facing the information sciences is represented by a set of fundamental challenges and sub-requirements, the most prominent being the need to keep pace with developments and to harmonize them with the required professional needs, especially for information science specialists. From this standpoint, the theoretical framework of this research addresses the following topics.

2.1. Information Science Specialist and Digital Era

Information science specialist is a term that encompasses those working in the field of informatics or are involved in a business related to information systems and its analysis, study, design, implementation, and everyone who deals with traditional and electronic information sources and works in the management of various information centers and those who teach informatics [6].

[8] defined he identity of information science specialist as the information scientists concerned with information science laws, theories, and philosophies; information system specialists are those who analyze information problems and design systems and networks, information mediators who work between the decision maker and the body of knowledge, information technology managers those who operate, maintain, and control information systems, and information managers who plan, develop, and control the information, human and material resources programs needed to implement them.

In light of the digital era and digital revolution affecting most sectors of society, it is deemed imperative for information science specialists to develop their skills and roles to keep up with this revolution, and are required to: (1) participate in creating the information and its marketing; (2) provide information to beneficiaries as quickly and accurately as possible; (3) preserve intellectual property rights and the values and norms of society, (4) participate with engineers and programmers for automated systems for libraries; (5) contribute to building the intellectual framework for the information society, and also creating and designing websites on the web, building digital libraries; (6) contribute toward database design, management, programming, information search and retrieval in the digital environment, system analysis, and

development, network management and websites development [1]; [7]; [29] and [10].

With rigorous investigation, [4] concluded that the skills and competencies required for information science specialists in a digital environment are represented in academic skills with which they are familiar with all dimensions of specialization, multiple linguistic skills to be able to deal with various multilingual information vessels, technical skills related to technical operations such as indexing, classification, and others, technical skills with which they are familiar with using and employing all kinds of technology, and future skills in order to be farsighted in the field and present their proposals based on their future imagination.

[17] asserted that there are new competencies and specifications for the information science specialists to adapt to the prevailing digital environment, where on the one hand, information science is unquestionably confronting new challenges represented by the requirement to contemplate the quality of information services, and on the other hand the need to simulate the requirements of the digital age to benefit from them, the most important of which are artificial intelligence and its reliability and reliance on it to optimize information services. Cloud computing refers to taking advantage of computer hardware and software developments to address information sources that can be stored in databases and are searchable via the Internet. Digitization of libraries by making use of scanning techniques and converting printed materials into a digital image that can be accessed via diverse internet platforms. The Semantic Web represents the space where the implicit relationships between data and information are explored by databases and web technologies.

In addition, the recent fourth industrial revolution has set advanced requirements for a new generation of the labor force with a comprehensive set of skills to meet the standards of the global market [21].

The enabling technologies for Industry 4.0 can be enumerated as: big data, cloud computing, Internet of things (IOT), cybersecurity, robotics, additive manufacturing (3D printing), augmented reality, horizontal and vertical integration, and simulation. [16]; [23] and [33].

Therefore, the information science specialists ought to accommodate these new technologies and employ them in enhancing and developing their new roles in the digital era, where they should collect, process, and analyze a large amount of data while providing a multitude of new opportunities for academic institutes, manage huge amounts of data in open systems and ensure real-time communication within the production process system by facilitating access to information from anywhere in the world at any time, thus increasing flexibility, use a new type of network that connects anything with the Internet through information-sensing tools to facilitate communication and the exchange of information in order to achieve smart recognition, monitoring, and management, maintain cybersecurity systems, build prototypes and finished products in three sizes for a wide array of purposes, use augmented reality application and tools, make the integration between computer and command processes across networks, and simulate the manufacturing processes by analyzing system input and output in real time and obtain a detailed report about the process.

2.2. Digital Competencies

Digital competencies at work are embodied by basic knowledge, skills, abilities, and other characteristics that enable people to accomplish their digital media-related professional tasks efficiently and with high productivity [22].

It is worth noting that the concept of digital libraries was not introduced in the last few years, rather, hundreds of millions of dollars have already been invested in the research that serves the employment of digital transformation in libraries or digital libraries as the early 1990s. All these trends have influenced the concept of information science toward a proportional approach and have discernibly impacted the nature of the tremendous technical development [24].

The digital skills of the specialists in the field of information science at educational institutions are critical, especially after the increasing use of contemporary and futuristic technologies and ICT in education, for instance, a plethora of information previously confined to books and articles available only in libraries is now easy to access, download, read, archive, and benefit from it through the Internet, including in formats such as scholarly dissertations, research information, and other digital information used for academic purposes [31].

In this regard, there have been multitudinous investigations that aimed to define the digital information competencies, including the study by [3] that emphasized that cataloging and classification skills are among the most fundamental skills that must be possessed by an LIS specialist, in addition to communication skills, language skills, computer skills, and the ability to deal with automated systems.

[18] defined the information competencies that employers seek in university graduates and the skills that graduates exhibit when they enter the workplace based on interviews with 23 US employers and 33 recent graduates from four US colleges and universities. They concluded with their findings that the information competencies include the ability to work in a team structure, communicate with people inside and outside the institute, make decisions and solve problems, obtain and process information, analyze quantitative data, possession of technical knowledge pertaining to the job, proficiency with

computer software programs, create and/or edit written reports, and the ability to positively influence others.

[17] deduced from their meticulous study that the basic skills essential for information professionals are academic skills in which they are familiar with all dimensions of specialization; language skills to deal with diversified multilingual information vessels; technical skills related to technical operations such as indexing, classification, extracting, and others; technical skills in which they are familiar with the use of all forms of technology that are a part of the technological revolution; have a deep knowledge of electronic information sources; assess information needs and design services to meet those needs; train the beneficiaries on the use of automatic and electronic resources and systems; contribute to the creation and construction of documentary software; should be aware of the use of networks and the web.

[30] indicated that in addition to information professionals' ability to deal with office operations such as storage, retrieval, information dissemination, classification, indexing, and self-education, they should acquire individual and management skills to deal with information in multiple electronic environments and meet the requirements of the beneficiaries and manage the information more efficiently, and possess professional and personal competencies in the era of technology and information. Furthermore, they should have the ability to communicate with others readily and effectively.

[9] discussed new roles for the information professionals to handle big data, and stated the requisite skills as advanced programming skills, the ability to handle a large amount of data, efficiency to provide data access, support for data management, and managing datasets. One of the most vital digital skills required for specialists in information science to efficaciously deal with the vast amount of digital information is searching, sharing, archiving, exploring, restructuring, and communicating digital information in multifarious forms [14].

[22] conducted 11 interviews with experts in the field of digitization and digital competencies and concluded that digital competencies for those working in office jobs include vast knowledge, skills, and abilities such as programming, detecting lack of knowledge, search, research, data management, virtual collaboration, networking, data sharing, data security/safety, problem-solving, self-management, and the ability and desire to train/educate others.

In the light of above studies and through reviewing what [26] stated about the key components of digital competencies which can be summarized in five categories as: (1) ***Information and data literacy***: Define information needs, search, and retrieve digital data, content and information. Evaluate the content information. Store, manage, and organize digital data. (2) ***Communication and collaboration:*** Interact, communicate, and collaborate through digital technologies. Participate in society through digital services. Manage one's digital identity and reputation. (3) ***Digital content creation:*** Create and edit digital information. Enhance and integrate information and content into an existing body of knowledge. Understanding how copyright and licenses are to be applied. Know how to give understandable instructions for a computer system. (4) ***Safety:*** Protect devices, content, personal data, and privacy in digital environments. Protect physical and psychological health, and to be aware of digital technologies for social inclusion. Be aware of the environmental impact of digital technologies and their use. (5) ***Problem solving:*** Identify needs and problems, and to resolve conceptual problems and problem situations in digital environments. Use digital tools to innovate processes and products. Stay updated with the digital evolution.

And what has been mentioned of the challenges facing the information science specialist in the digital era and the fourth industrial revolution, and the new roles that they have to play, and in light of the studies and literature reviewed that dealt with digital competencies in terms of concept and requirements. This research attempted to identify the digital competencies required by information specialists at Saudi Universities.

3. Experimental Consideration

3.1. Research Methodology

A descriptive and analytical approach was utilized in this study. Such approach aims to study scientific phenomena and problems by describing them in a realistic manner and analyzes them in a scientific way to answer research questions pertaining to the determination of the digital competencies required for information science specialists at Saudi Universities.

3.2. The Research Sample

The research sample comprised 24 specialists in information science, and Table 1 encapsulates the distribution of the sample members based on the variable years of practical experience.

Table 1 Description of the Research Sample

The Variable	Variable Levels	Frequency	Percent
Experience Years	Less than 10 years	9	37.5 %
	10 years and more	15	62.5 %

3.3. The Research Tool

A set of digital competencies required for information science specialists were extracted from theoretical frameworks and previous studies. It was placed in the questionnaire that aimed at assessing the importance of these competencies from the perspective of the specialists in the information science field, such that the response to its items was made considering a three-gradient scale (important, neutral, and not important), and the corresponding grades were assigned to it upon correction (3/2/1).

To verify the validity of the content of questionnaire's, the opinions of nine arbitrators in the information science field were relied upon. This was to ascertain the appropriateness of the questionnaire items and its linguistic formulation, and the need to add any other relevant items. In light of the arbitrators' directives, the vital amendments and additions they referred to were introduced. The questionnaire was then presented again to three of the previous arbitrators, and the amendments and additions were subsequently approved. The questionnaire consisted of its final form 29 items characterizing the digital competencies essential for an information science specialist at Saudi universities.

The questionnaire reliability was gauged by calculating Cronbach's alpha coefficient for the questionnaire before deleting the item degree and after deleting it, on a sample consisting of seven information science specialists. The value of the Cronbach's alpha reliability coefficient was .79, and the values of Cronbach's Alpha upon deletion of items ranged from .75 to .79. This indicates that the Cronbach's alpha values obtained upon deletion of items did not enhance the questionnaire reliability, and that the reliability coefficient value by the Cronbach's alpha method was acceptable.

3.4. Research Procedure

The overall research procedure can be delineated as follows:

1. Viewing studies and literature related to the subject of the research.
2. Preparing the research tool (questionnaire) in its initial form by thoroughly reviewing a set of relevant studies and articles.
3. Gauging the validity and the reliability for the questionnaire.
4. Employing the questionnaire after the research sample.
5. Statistical processing of the data from the questionnaire application.
6. Discussing the research findings.

4. Research Results

4.1. Results of the First Question

The first question states: "What are the digital competencies required for information science specialists at Saudi Universities?"

To answer this question, the frequency, percentage, mean, and standard deviation of the sample members' responses were calculated for each item of digital competencies required for information science specialists. Based on the fact that each item has a degree that extends between (1 to 3), the range of grades is 2 and the length of the category is 0.67. Therefore, if the mean value is 1 to less than 1.67, the level is low, if between 1.67 to less than 2.34, the level is medium, and if between2.34 to 3, the level is high, and the results are as depicted in Table 2.

Table 2 :
Frequencies, Percentages, Means, and Standard Deviations of the Digital Competency Items Required for Information Science Specialists

Item No.	Digital Competencies		Responses			Mean	Std. Deviation	Importance level	Order by Importance
			Not importa	Neutral	Importa nt				
1	Computer usage	f	0	0	24	3.00	.000	High	1
		%	0	0	100				
2	Internet usage	f	0	0	24	3.00	.000	High	2
		%	0	0	100				
3	Mastering Microsoft Office applications	f	0	0	24	3.00	.000	High	3
		%	0	0	100				
4	Data dissemination and sharing via the Internet	f	0	3	21	2.88	.338	High	7
		%	0	12.5	87.5				
5	Using internet search engines	f	0	0	24	3.00	.000	High	4
		%	0	0	100				
6	Using electronic archiving systems (data migration)	f	1	6	17	2.67	.565	High	21
		%	4.2	25.0	70.8				
7	Using electronic bibliographic control tools	f	1	6	17	2.67	.565	High	22
		%	4.2	25.0	70.8				
8	Analysis of websites and the intellectual production published on them	f	0	4	20	2.83	.381	High	11
		%	0	16.7	83.3				
9	Data merging with the web environment	f	0	3	21	2.87	.338	High	10
		%	0	12.5	87.5				
10	Dealing with multiple electronic indexing applications (MARC-21, Metadata, OPAC)	f	1	4	19	2.75	.532	High	16
		%	4.2	16.7	79.2				
11	Development of electronic learning resources	f	0	2	22	2.92	.282	High	5
		%	0	8.3	91.7				
12	System analysis.	f	0	5	19	2.79	.415	High	12

		%	0	20.8	79.2				
13	Data Processing (big data)	f	1	4	19	2.75	.532	High	17
		%	4.2	16.7	79.2				
14	Dealing with database management systems such as Oracle and SOL	f	1	4	19	2.75	.532	High	18
		%	4.2	16.7	79.2				
15	Dealing with electronic learning management systems (LMS)	f	0	7	17	2.71	.464	High	19
		%	0	29.2	70.8				
16	Designing interactive web pages	f	0	8	16	2.67	.482	High	23
		%	0	33.3	66.7				
17	Development of digital learning objects.	f	0	7	17	2.71	.464	High	20
		%	0	29.2	70.8				
18	Dealing with integrated systems for managing libraries and information centers	f	0	5	19	2.79	.415	High	13
		%	0	20.8	79.2				
19	Using various types of digital networks	f	0	3	21	2.88	.338	High	8
		%	0	12.5	87.5				
20	Using synchronous and asynchronous communication tools	f	0	2	22	2.92	.282	High	6
		%	0	8.3	91.7				
21	Using different programming languages, including: JAVA, PHP, XML)	f	2	11	11	2.38	.647	High	27
		%	8.3	45.8	45.8				
22	Mastering cloud computing applications	f	0	5	19	2.79	.415	High	14
		%	0	20.8	79.2				
23	Mastering the use of smart phone applications	f	0	3	21	2.88	.338	High	9
		%	0	12.5	87.5				
24	Using 3D Printing	f	6	10	8	2.08	.776	Medium	29
		%	25.0	41.7	33.3				
25	Using Web2 applications	f	1	3	20	2.79	.509	High	15
		%	4.2	12.5	83.3				
26	Using Semantic Web Applications	f	1	8	15	2.58	.584	High	25
		%	4.2	33.3	62.5				
27	Using artificial intelligence tools and software	f	1	7	16	2.63	.576	High	24
		%	4.2	29.2	66.7				
28	Using simulation and augmented reality applications	f	4	11	9	2.21	.721	Medium	28
		%	16.7	45.8	37.5				
29	Follow-up and maintenance of cybersecurity systems	f	1	10	13	2.50	.590	High	26
		%	4.2	41.7	54.1				
Total Degree of the Digital Competencies						79.38	6.358	High	

It is evident from Table 2 that the importance of the digital competencies required for the information science specialists from their point of view was high for all items, except for the two items 24 and 28, for which it was medium. The mean value of the total degree of the digital competencies divided by the number of items was equal to 2.74, indicating high importance for the digital competencies on the whole.

The previous presentation clearly exhibits the importance of the digital competencies required by the information science specialists from the viewpoint of specialists, and the order of these competencies according to their importance is as follows: computer usage, internet usage, mastering Microsoft Office applications, using internet search engines, development of electronic learning resources, using synchronous and asynchronous communication tools, data dissemination and sharing via the Internet, using various types of digital networks, mastering the use of smart phone applications, data merging with the web environment, analysis of websites and the intellectual production published on them, system analysis, dealing with integrated systems for managing libraries and information centers, mastering cloud computing applications, using Web2 applications, dealing with multiple electronic indexing applications (MARC-21, Metadata, OPAC), data processing (big data), dealing with database management systems such as Oracle and SQL, dealing with electronic learning management systems (LMS), development of digital learning objects, using electronic archiving systems (data migration), using electronic bibliographic control tools, designing interactive web pages, using artificial intelligence tools and software, using Semantic Web applications, follow-up and maintenance of cybersecurity systems, using different programming languages, including JAVA, PHP, and XML, using simulation and augmented reality applications, and using 3D printing.

These competencies are consistent with the results of a multitude of studies that dealt with the competencies of the LIS specialist, especially in the era of the fourth industrial revolution, and the techniques which necessitate the information science specialist to be aware of them [14]; [17] ; [22] and [30].

4.2. Results of the Second Question

The second question states: "Does the specialists' assessment for the importance of the digital competencies required for information science specialists at Saudi Universities differ according to work experience (less than 10 years/10 years or more)?". To answer this question, the Mann-Whitney test was used to investigate the significance of the differences among the mean ranks of specialists' scores in assessing the digital competency importance required for information science specialists according to the variable of practical experience. The results are as encapsulated in Table 3.

Table 3

Results of the Mann-Whitney Test for Differences Among Specialists in Assessing the Digital Competencies Importance Required for the Information Science Specialists According to the Experience Variable

Item No.	Digital Competencies	Group	Mean Rank	Sum of Ranks	U	Z	Sig.
1	Computer usage	Less than 10 years	12.50	112.50	67.500	0.000	1.000
		10 years and more	12.50	187.50			
2	Internet usage	Less than 10 years	12.50	112.50	67.500	0.000	1.000
		10 years and more	12.50	187.50			
3	Mastering Microsoft Office applications	Less than 10 years	12.50	112.50	67.500	0.000	1.000
		10 years and more	12.50	187.50			
4	Data dissemination and sharing via the interne.	Less than 10 years	14.00	126.00	54.000	-1.404	.160
		10 years and more	11.60	174.00			
5	Using Internet search engines	Less than 10 years	12.50	112.50	67.500	0.000	1.000
		10 years and more	12.50	187.50			
6	Using electronic archiving systems (data migration)	Less than 10 years	11.78	106.00	61.000	-0.488	.625
		10 years and more	12.93	194.00			
7	Using electronic bibliographic	Less than 10	10.50	94.50	49.500	-	.176

	control tools	years				1.352	
		10 years and more	13.70	205.50			
8	Analysis of websites and the intellectual production published on them	Less than 10 years	10.50	94.50	49.500	-1.661	.097
		10 years and more	13.70	205.50			
9	Data merging with the web environment	Less than 10 years	12.67	114.00	66.000	-0.156	.876
		10 years and more	12.40	186.00			
10	Dealing with multiple electronic indexing applications (MARC-21, Metadata, OPAC)	Less than 10 years	12.17	109.50	64.500	-0.253	.800
		10 years and more	12.70	190.50			
11	Development of electronic learning resources	Less than 10 years	12.17	109.50	64.500	-0.373	.709
		10 years and more	12.70	190.50			
12	System analysis	Less than 10 years	12.33	111.00	66.000	-0.127	.899
		10 years and more	12.60	189.00			
13	Data processing big data	Less than 10 years	13.44	121.00	59.000	-0.717	.474
		10 years and more	11.93	179.00			
14	Dealing with database management systems such as Oracle and SQL	Less than 10 years	10.89	98.00	53.000	-1.223	.221
		10 years and more	13.47	202.00			
15	Dealing with electronic LMS	Less than 10 years	13.33	120.00	60.000	-0.568	.570
		10 years and more	12.00	180.00			
16	Designing interactive web pages	Less than 10 years	12.50	112.50	67.500	0.000	1.000
		10 years and more	12.50	187.50			
17	Development of digital learning objects	Less than 10 years	10.67	96.00	51.000	-1.249	.212
		10 years and more	13.60	204.00			
18	Dealing with integrated systems for managing libraries and information centers	Less than 10 years	11.00	99.00	54.000	-1.143	.253
		10 years and more	13.40	201.00			
19	Using various types of digital networks	Less than 10 years	12.67	114.00	66.000	-0.156	.876
		10 years and more	12.40	186.00			
20	Using synchronous and asynchronous communication tools	Less than 10 years	12.17	109.50	64.500	-0.373	.709
		10 years and more	12.70	190.50			
21	Using different programming languages, including JAVA, PHP, XML	Less than 10 years	13.39	120.50	59.500	-0.531	.596
		10 years and more	11.97	179.50			
22	Mastering cloud computing applications	Less than 10 years	12.33	111.00	66.000	-0.127	.899
		10 years and more	12.60	189.00			
23	Mastering the use of smart phone applications	Less than 10 years	14.00	126.00	54.000	-1.404	.160
		10 years and more	11.60	174.00			
24	Using 3D Printing	Less than 10 years	12.72	114.50	65.500	-0.127	.899
		10 years and more	12.37	185.50			
25	Using Web2 applications	Less than 10 years	11.72	105.50	60.500	-0.644	.520
		10 years and more	12.97	194.50			
26	Using Semantic Web applications	Less than 10 years	11.39	102.50	57.500	-0.703	.482
		10 years and more	13.17	197.50			
27	Using artificial intelligence tools and software	Less than 10 years	12.22	110.00	65.000	-0.181	.857
		10 years and more	12.67	190.00			
28	Using simulation and augmented reality applications	Less than 10 years	11.67	105.00	60.000	-0.486	.627
		10 years and more	13.00	195.00			
29	Follow-up and maintenance of cybersecurity systems	Less than 10 years	14.17	127.50	52.500	-1.019	.308
		10 years and more	11.50	172.50			
Total Degree of the Digital Competencies		Less than 10 years	12.06	108.50	63.500	-.240	.810
		10 years and more	12.77	191.50			

It is clear from Table 3 that there are no statistically significant differences between the mean ranks of scores of specialists belonging to the two categories with regard to experience while assessing the digital competencies importance required for information science specialists. This means that specialists with different practical experience gave approximately the same level of importance to all the digital competencies considered in this research, which indicates the importance of these competencies from the point of view of specialists with different practical experience.

Furthermore, such results may be due to the concordance in the level of knowledge and skills among the information science specialists at Saudi Universities, where the modern technological revolution has made all academics and specialists cultivate the skills vital in the labor market to meet the requirements of the beneficiaries and to adapt to the new digital environment, and the effort by those in the field of information science in developing the profession scientifically and technically with the ultimate goal of making it more flexible, dynamic, and up-to-date with technical reforms by training other information specialists and workers. This is consistent with the findings of [17] and [34]

In addition, [25] cogently remarked that the factors that affect the determination of these competencies include social and economic differences, information-use policies, professional principles, and ethics of the specialty, intellectual property, geographic and economic links, compatibility at the information level, the operational framework for public services and information technology, and that all these factors are homogeneous among the information science specialists at Saudi universities.

5. Conclusion

The class of information science specialists encompasses all the professionals working in the field of analyzing, studying, designing, and implementing information systems, and everyone who deals with traditional and electronic sources of information, and who work in managing various information centers, and teach informatics. The tremendous advancements in the field of ICT have imposed unprecedented burden on the information science specialists and put them in front of fundamental challenges that require them to develop their tools and skills to coexist with these changes and developments.

According to the research results, a set of recommendations and proposals can be stated as follows: (1) To direct the attention of those responsible for the higher education system to the pivotal role that the information science specialists play in the development at Saudi universities. (2) To develop the requisite training

programs in information science at Saudi universities to cope with the current revolution in ICT. (3) To provide financial and technical support to nurture the skills of information science specialists at Saudi universities. (4) To provide training courses to develop the competencies and skills of the information science specialist regarding the latest technologies and innovations that serve their field of work. (5) To appraise the training needs of information science specialists at Saudi universities. (6) To adopt the principle of strategic planning and develop the competencies and skills of information science specialists at Saudi universities. (7) To conduct further studies on assessing the status of the information science specialists at Saudi universities and investigate the best procedures for their development.

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