

# Exploring the Level of Computer Literacy for Candidates in Higher Education: ICDL Programme at Bahrain Polytechnic

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## ABSTRACT

Bahrain Polytechnic is a Higher Education technical institution established in 2008 (by Royal Decree No. 65 for the year 2008). Its main mission is to supply the Bahraini economy with a skilled Bahraini labour force aiming to contribute to economic growth and diversification. The Polytechnic ensures that its values of excellence, learning and innovation are achieved by designing curricula that meet international standards as well as national and individual needs through continuous consultations with the industries and international education institutions. The development of computer and technological literacy is a significant predictor for success in the workplace and is also one of the key skills that the polytechnic provides through its programmes to students and faculty. This paper explores how computer literacy and skills are acquired by educators and students through International Computer Driving License (ICDL) tools employed at Bahrain Polytechnic. The study also considers the challenges that hinder learners from completing the requirements of ICDL. If adequate numbers of faculty and students have already learned basic computer skills, then the question facing the polytechnic is if computer literacy should continue to be taught at all levels. To answer this question, ICDL tests were administered to ascertain the computer literacy level of existing faculty and students. The results of the tests will determine which ICDL tests students and faculty should be placed on in order to address their computer literacy needs.

**Keywords--** International Computer Driving License (ICDL), Higher Education, Computer Literacy

## I. INTRODUCTION

Computer literacy is the base for lifelong learning (Köretal., 2017). The advancement in the field of computing leads to the idea of computer literacy. The computer literacy level expected to be mastered depends on the desired level of mastery in all the sectors in a society. In order to build a computer literate society, students' computing skills should be reinforced to from an early age. The higher education sector has witnessed massive investment in recent years which was initiated by the

Ministry of Education's Schools of the Future in Bahrain aiming to equip Bahraini students with the appropriate computer skills and encouraging them to learn through e-learning tools. Bahrain Polytechnic supported this initiative by establishing Moodle courses to run its curricula as well as running International Computer Driving License (ICDL) courses for both staff and students.

Wong, Neves and Negreiros (2017) state that computer literacy comprises a wide range of knowledge such as how to use word processing, spreadsheets, presentations and database software as well as including Internet and online activities. Currently, information technology proficiency seems to be essential in today's competitive workplace (Grant, Malloy & Murphy, 2009). Computer literacy enables skills acquisition (Jayasuriya & Chapman, 1997). Al-Adwan and Smedley (2012) stated that students with richer computer experiences demonstrated better learning attitudes and better achievement.

## II. RESEARCH METHODOLOGY

A case study research method is adopted to answer the research questions. Quantitative approach is used in a form of content analysis which was performed on ICDL tests' results for staff and students. Then statistical analysis was conducted on ICDL tests data to highlight the importance of ICDL programme in upskilling staff and students in ICT and to identify their current level of computer literacy.

### *Research Design*

This study follows a descriptive research design in which quantitative and qualitative approaches are used to gather information. The core data was collected from the recorded results of candidates' tests in the ICDL system in which a content analysis method is adopted to identify the main theme and trend underlying the results. While, on the other hand, qualitative information is obtained from the case study qualitative approach.

### *Sample of Study*

Two marked sampling techniques were used for both quantitative and qualitative data. Firstly, sampling

based on a secondary dataset was obtained from the ICDL tests. Nowadays, it becomes easy to access, collect, archive, and compile data due to the advancement in technology (Johnston, 2017). Therefore, utilizing existing data becomes more prevalent. Ellram, & Tate (2016) define secondary data as “quantitative or qualitative data that has been collected by someone other than the researcher(s) for a different purpose than its intended use in research”. The secondary data collected present major advantages, according to Ellram, & Tate (2016), secondary data save a great deal of time and human effort. Though most of the collected data need to be cleaned and formatted.

From the larger population of ICDL data, only data from “Bahrain Polytechnic ICDL Center” in Bahrain were explored within the period from 2010 to 2013. Therefore, the sample includes datasets of all tests conducted to complete ICDL program that consists of 7 modules which both students and staff at Bahrain Polytechnic have attempted. Thus, the sample comprises all registered candidates (students and staff) in ICDL system of Bahrain Polytechnic during the above-mentioned period.

Secondly, a sample size of three interviewees was selected for the interviews. The small sample size was commonly due to the small number of certified trainers and experts in ICDL available at Bahrain Polytechnic. Currently, there are only three available experts in campus

who can be interviewed. With this small sample size for the interview, Boddy, (2016) clarified that the issue of what represents a suitable sample size in qualitative research is only really answerable within the context of the research being conducted. Indeed, the context of this research is exploring the importance of ICDL within “Bahrain Polytechnic” scope and includes only candidates who are registered in the ICDL program in a three-year period. ICDL center at Bahrain Polytechnic is relatively small with only one coordinator and 2 certified trainers.

#### **Data Collection**

The table below (Table 1) shows a sample of the raw data that was collected in this study. The table shows all the parameters considered during the data collection. These included the centre where the assessment was taken, the IT lab in which assessment was conducted, Core Syllabus (which was 5), the Course Modules, the dates on which Assessment were taken, duration of the assessment (that is the time taken for the assessment to be completed), the score obtained on the assessment and the Language in which the assessment was conducted.

#### **Data Analysis**

The data was analysed by means of Descriptive Statistics (in Excel) to indicate the measures of central tendency and spread. The mean, median, mode, standard deviation and range were obtained.

**Table 1:** Sample of raw data showing all the parameters (like modules, duration and scores) involved

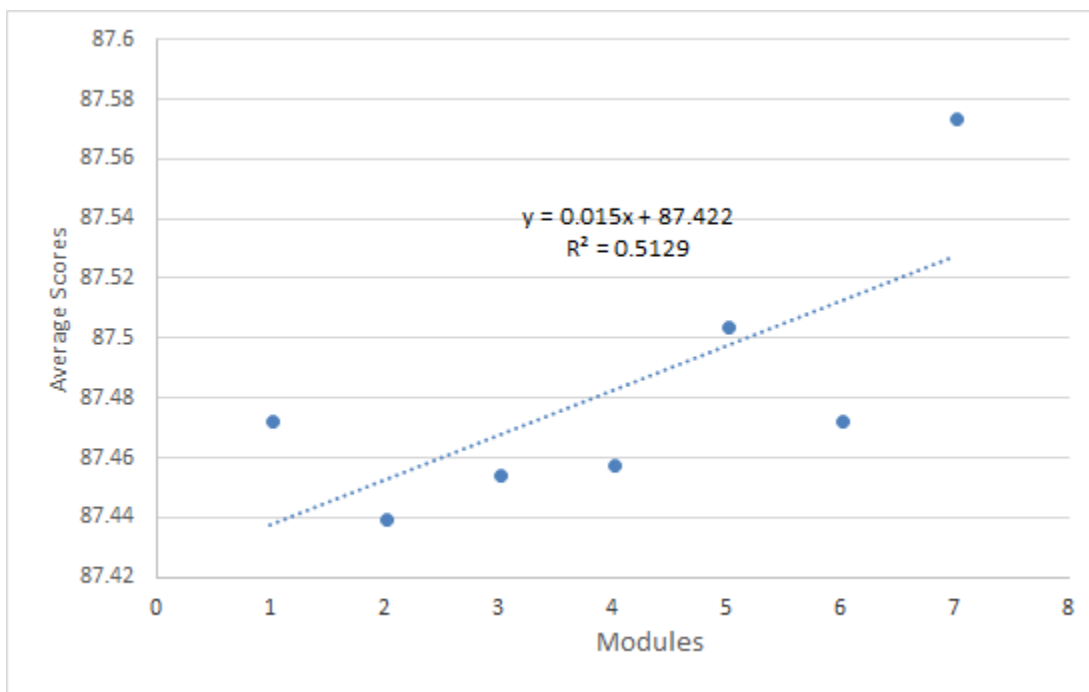
Centre	Lab	Product	Module	Test date	Durati on	Sco re	Langu age
Bahrain Polytech nic	LabBP1 020	Core Syllabus 5	Module 2 - Using the Computer and Managing Files	06-Jun- 2013	00:45:0 0	81	English
Bahrain Polytech nic	LabBP1 020	Core Syllabus 5	Module 1 - Concepts of Information and Communication Technology	26-May- 2013	00:43:0 0	81	English
Bahrain Polytech nic	LabBP1 020	Core Syllabus 5	Module 3 - Word Processing	28-Jun- 2011	00:44:5 2	86	English
Bahrain Polytech nic	LabBP1 020	Core Syllabus 5	Module 2 - Using the Computer and Managing Files	11-Jun- 2012	00:45:0 0	89	English
Bahrain Polytech nic	LabBP1 020	Core Syllabus 5	Module 4 - Spreadsheets	05-Jun- 2012	00:45:0 0	75	English
Bahrain Polytech nic	LabBP1 020	Core Syllabus 5	Module 6 - Presentation	03-Feb- 2011	00:45:0 0	78	English
Bahrain Polytech nic	LabBP1 020	Core Syllabus 5	Module 3 - Word Processing	25-Jan- 2011	00:45:0 0	81	English

				4				4
Bahrain Polytechnic	LabBP1 020	Core Syllabus 5	Module 5 - Using Databases	21-May-2013	00:32:00	78	English	
Bahrain Polytechnic	LabBP1 020	Core Syllabus 5	Module 6 - Presentation	28-Mar-2013	00:37:00	89	English	
Bahrain Polytechnic	LabBP1 020	Core Syllabus 5	Module 3 - Word Processing	21-Mar-2013	00:33:00	92	English	
				3				3
Bahrain Polytechnic	LabBP1 020	Core Syllabus 5	Module 3 - Word Processing	25-Jan-2011	00:42:27	75	English	
				1				1
Bahrain Polytechnic	LabBP1 020	Core Syllabus 5	Module 4 - Spreadsheets	27-Mar-2013	00:29:00	97	English	
Bahrain Polytechnic	LabBP1 020	Core Syllabus 5	Module 2 - Using the Computer and Managing Files	24-Mar-2013	00:27:00	97	English	
Bahrain Polytechnic	LabBP1 020	Core Syllabus 5	Module 5 - Using Databases	21-Mar-2013	00:35:00	86	English	
Bahrain Polytechnic	LabBP1 020	Core Syllabus 5	Module7 - Web Browsing and Communication	23-May-2012	00:29:00	86	English	
Bahrain Polytechnic	LabBP1 020	Core Syllabus 5	Module 1 - Concepts of Information and Communication Technology	17-May-2012	00:27:00	78	English	
Bahrain Polytechnic	LabBP1 020	Core Syllabus 5	Module 6 - Presentation	26-Mar-2012	00:33:00	97	English	
Bahrain Polytechnic	LabBP1 020	Core Syllabus 5	Module 3 - Word Processing	14-Mar-2012	00:36:00	97	English	

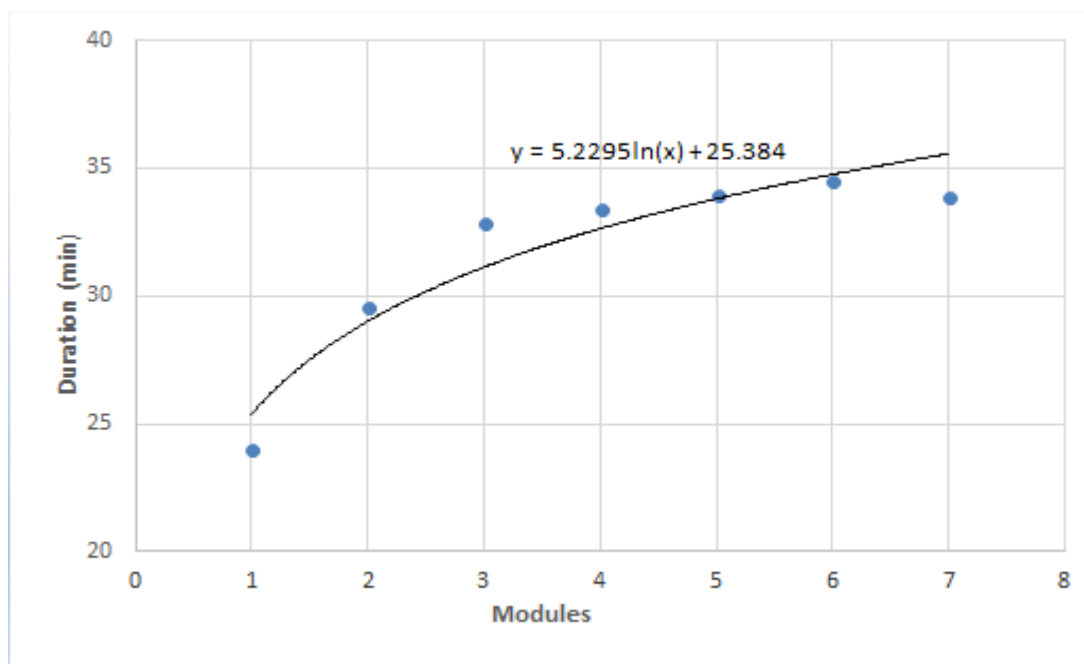
**Table 2:** Descriptive Statistical data showing the measures of central tendency and measures of spread obtained after assessment of all the 7 Modules

	Module 1	Module 2	Module 3	Module 4	Module 5	Module 6	Module 7
<b>Mean</b>	87.47253886	87.44000000	87.45482546	87.45773196	87.50417000	87.4725957	87.51419558
<b>Standard Error</b>	0.217468886	0.216003338	0.216028155	0.216853855	0.217819	0.21699051	0.21858312
<b>Median</b>	89	89	89	89	89	89	89
<b>Mode</b>	89	89	89	89	89	89	89
<b>Standard Deviation</b>	6.755551	6.7447021	6.7430169	6.75387494	6.748883	6.747672	6.7407292
<b>Sample Variance</b>	45.63747124	45.49100616	45.4547917	45.61482664	45.54743	45.5320805	45.43742985
<b>Kurtosis</b>	-0.96095825	-0.965788433	-0.96094233	-0.96684345	-0.95731	-	-
<b>Skewness</b>	-0.14552412	-0.134133211	-0.13923443	-0.14008662	-0.14978	0.96492285	0.953323406
						-0.1404117	-0.15148644

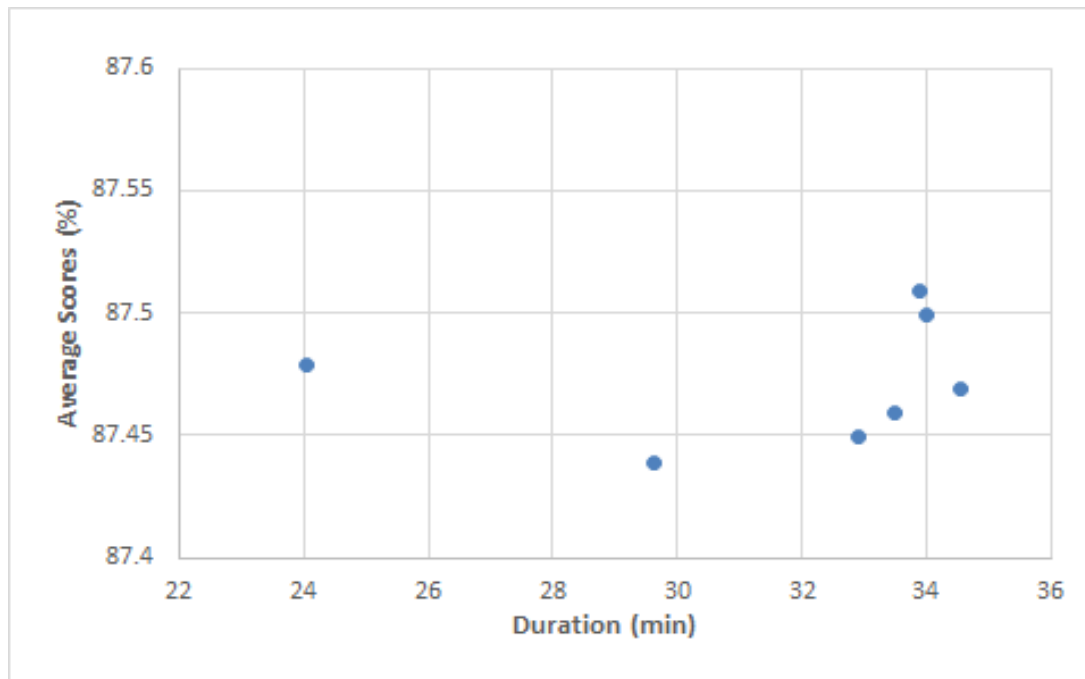
<b>Range</b>	25	25	25	25	25	25	25
<b>Minimum</b>	75	75	75	75	75	75	75
<b>Maximum</b>	100	100	100	100	100	100	100
<b>Sum</b>	84411	85254	85181	84834	84004	84586	83226
<b>Count</b>	976	976	976	976	976	976	976



**Figure 1:** Shows the relationship between the Modules assessed and the means scores (in %) obtained on the modules assessed.



**Figure 2:** Figure shows the relationship between the Modules assessed and the time it takes (duration) to complete an assessment.



**Figure 3:** Shows the relationship between the duration (in minutes) of an assessment of a Module and the Mean Scores (%) obtained in that module.

### III. FINDINGS

The Measures of Central Tendency and the Measures of Variation obtained after analysing the raw data by means of descriptive statistical analysis, indicated a mean score between 87.4% and 87.5%, on all the 7 modules. The modal score was 89% and the standard deviation ranged between 6.74 and 6.75. This clearly indicated that among all the 7 modules there were no significant differences among the mean scores obtained.

A plot of the Mean score and the Modules (Fig. 1) indicates a significant increase in the Mean scores obtained by the students for each of the 7 modules. The line of best fit shows a positive linear correlation between the Course Modules and the Average scores obtained by the students. The correlation coefficient  $R^2$  is 0.5129, indicating a significantly positive and linear correlation.

Figure 2 seeks to explore whether there is a relationship between the Duration of the assessment and the Modules assessed. The relationship between the length of time spent in completing the assessment and the Modules depicts a growth curve which shows a sharp increase from Modules 1 to 3 and then plateaus for Modules 4 to 7. It appears students spent a shorter time (on average) when completing assessments on Module 1. The times they spent subsequently on Modules 2 and 3 assessments increased sharply, showing a logarithmic rise (Fig2). However, between Modules 4 and 7, students appeared to have spent almost the same time in completing the assessments.

The overall average test scores for all the Modules appear to fall between 87.4% and 87.6 %, regardless of how long it took (duration) for an assessment of a Module to be completed. The duration here, refers to the mean length of time (on average) it took for an assessment of a module to be completed by all students. It is evident from this data (Fig 3) that the duration or how long it took for assessment of a Module to be completed had no high significant impact on the scores obtained on the assessments, although there were very slight significant differences (to the order of 0.01).

### IV. DISCUSSION

The findings of the study show that the use of International Computer Driving Licence (ICDL) modules for both staff and students could be beneficial depending on what each participant needed to develop in. The inevitable, a knowledge-based economy, is what the Polytechnic aimed to achieve through changing and adapting a more computer-based educational curriculum.

The findings further showed that the participants achieved different scores in each module and they also spent different durations completing the tests. Implementing ICDL tests could open a new outlook to the education sector and establish a computer literate society as found in Elobaid and Elobaid (2014). The concept of computer literacy has existed for a long time and an early argument was that it creates a good citizen who is

productive in society (Childers, 2003). Another argument Childers (2003) makes is that computer literacy, as the one provided by ICDL, is similar to driving a car which some choose to learn the basics for, others do not have interest in learning it while others get in depth knowledge about using and driving it. Thus, it was noticed that the participants in the ICDL modules chose what interested them the most and what they needed to get the knowledge in to learn at their own pace and to be more computer-literate. Considering Bahrain Polytechnic's mission and vision, computer literacy could be counted as a measurement to how its graduates adopt and adapt new technologies to be global employees in terms of computer proficiency. Technologies alter the form of knowledge and productivity that are essential to societies and having computer-literate staff is a universal necessity which reflects the goal of running ICDL courses in the context of this paper.

## V. LIMITATIONS OF THE STUDY

This study is limited to students, tutors, and allied staff at Bahrain Polytechnic who are registered in the ICDL system. Thus, all candidates who are not officially registered in the system are excluded from this study. The gathered information covers the period from 2010 to 2013 in which ICDL courses were offered and available to deliver the modules of the program. One of the main limitations of this study is the restriction of the chosen method. Content analysis is not serving when there is a need to evaluate user opinion, satisfaction, or need. Therefore, the focus of the information gathered from the case study is adopted as a second method to enrich the content with more information about the program and its context.

## VI. CONCLUSION

The contribution of the present study is to provide an overall perception about computer literacy implementing ICDL at the higher education sector in the Kingdom of Bahrain. Participants' interest in developing computer skills. Bahrain Polytechnic shows huge potential through the development and implementation of e-learning in teaching and learning as well as the staff professional development programs. However, some of the applications as ICDL are only provided to registered participants. This opens new perspectives to find and adopt more effective

and cost-free tools to enhance the implementation of computer literacy in teaching and learning.

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