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Analyzing the Technology Affecting on the Social Integration of Students at University

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***Abstract*—**The aim of this paper is to examine the technology access and use on the affecting social integration of local students at university. This aim is achieved by designing a structural equation modeling (SEM) in terms of integration with peers, integration with faculty, faculty support and on the other hand, examining the socio demographic impact on the technology access and use. The collected data were analyzed using the WarpPLS 5.0 software. This study was survey based and it was conducted at a public university in Canada. The results of the study indicated that technology has a strong impact on integration with faculty, faculty support, but technology does not have an impact on integration with peers. However, the social demographic has also an impact on the technology access and use.

***Keywords*—**Faculty, integration, peer, technology access and use.

I. Introduction

IN the 21st century the digital technology plays a crucial role in higher education and students in higher education are using frequently digital technology, namely smartphones, tablet PCs, notebook, etc. [1], [2]. In higher education, the social integration is a behavior related to social involvement which includes meeting with other students, having friends in the extra-curriculum activities, and finally having social and cultural activities on campus [11]. According to [3] and [4], social integration is the amount of personal contacts and interactions where students can have contacts and interactions with their peers and with their academics. Reference [5] stated that in higher education, the social integration factors have a positive influence on engineering students' academic performance and these factors includes individual effort, peer interaction and faculty contact. On the other hand, [6] indicated that age, social interactions and gains in the career development influence positively for the technical degree pursuers and it provides the importance of social integration opportunities and their impact on the university level students.

Social integration at the university level is beneficial to all students in particular, for the working class students. However, working class students receive less support from their family and their hometown friends [7]-[9]. Furthermore, they also stated that they are more benefitted from the social support that is offered by their peers and faculty in higher education as compared to middle-class students. According to [10], students can have their identity within a community of the higher institutions in terms of their improvement to achieve their academic potentials. Reference [3] stated that social networking with peers reflects by students' social integration and it is actively linked to their learning outcome.

Reference [4] stated that student's social integration included formal and informal social experience at the higher intuitions. Formal social experience includes campus club attendance, teamwork with other students; on the other hand, informal social experience includes quality of social interaction with peers outside of the classroom. In higher education, the social interventions include students' organizations, on campus social activities, and the residential learning communities. However, students who are poor experienced with the social integration, university administration are less likely to recognize two specific factors that contribute to their departure [3]. According to [3] and [12], students not only need to graduate but also students need to participate within and outside of the context of the technology learning social environment.

According to [13], in the United States, technology has become essential for many of the individuals in the day-to-day activities and social integration of students may differ between the students [14], older students [14], and students transferring into first degree from the higher institutions [15].

II. Problem Statement

Reference [16] indicated that computer-usage did not alter the effects of students' social involvement in higher educations. According to [17], students in higher education used email for the social integration purposes and the majority of the email activity did not relate to the either form of integration. Reference [18] indicated that poor computer placement test performance leads to withdraw students from courses. Reference [19] concluded the social integration is observed significantly and directly linked to the term-to-term persistence, but it is also less strong related to year-to-year persistence. According to [19], in higher education, the self-sufficient social systems for which students' social integration affects the decision to drop-out or stay. According to [20], in higher education, researchers and practitioners have struggled to understand how the technology affects students in higher education learn, interact, and grow. Furthermore, [20] stated that researchers have little ideas about the understanding how the technology affect students characteristic namely demographics and social and technological backgrounds affect this relationship between the social networking sites namely perceived social support and feelings of community.

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Reference [11] stated in higher education institutions, student interacts with their peers, faculties, courses, and university affect their goal commitment to life and institutional commitment to the university.

III. Research Question

Is technology access and use affecting the social integration of local students in higher education?

IV. Research Hypothesis

The hypothesis of this research are given below:

- There is no significant between the technology access and use and integration with peers by local students (H_1);
- There is no significant between the technology access and use and integration with faculty by local students (H_2);
- There is no significant between the technology access and use and integration with faculty support by local students (H_3);
- There is no significant between the socio demographic and the technology access and use with the social integration by local students (H_4).

V. Aim and Objectives

The aim of this paper is to design a structural equation model (SEM) on the impact of technology access and use on the social integration in higher education. This aim is achieved through the following research objectives:

- To examine the impact of technology access and use on the integration with peers;
- To examine the impact of technology access and use on the integration with faculty;
- To examine the impact of technology access and use on the faculty support;
- To examine the relevant socio demographic moderators of these relationships on the technology access and use.

To design a structural equation model (SEM) on the impact of technology access and use on the social integration (integration with peers, integration with faculty, and faculty support) of students in higher education.

VI. Literature Review

In higher education institutions, the social integration can be considered of the nature and quality of integration with their peers and faculty members [4]. Reference [21] stated that social integration in higher education institution is nothing but how students perceived themselves in terms of relationships with students and staff and outside of the group. However, based on the students' perceptions of individual both within and outside of university, students can come across a conflict of expectations between peers and faculty members and their family and friends outside of the university campus.

A study was conducted by [16] in West Tennessee and the sample size was 800. The research results indicated that computer usage have an effect on the social integration of higher education institutions in particular, for the career development, communication, and math/science/technology outcome variables. Reference [22] stated that social integration varies student to student and "few would deny that the social lives of students in college and their exchanges with others inside and outside the institution are important in retention decision". A study was conducted by [23] found students through peer instructions can maintain or establish a good social support networking which can help them in terms of stress and that is associated within the university environment.

According to [24], in a larger class peer relations are very important in particular where students feel isolation and anonymity which finally can lead to a bigger adjustment issue. Several researchers indicated that a student's success in the social integration is enhanced between students and other members of the higher education institution by the human interaction, collaboration, and formation of interpersonal connections. A study was conducted by [25] and their research results indicated that a few factors of the social integration consist of students' social and psychological comfort with their university surroundings, strong association or collaborations with a common group of students and finally a belonging to the institution. However, they further indicated that these factors are helpful with students to keep connection with their peers in terms of achieving goals.

According to [26] and [27], in higher education, students refer to the amount of physical and psychological energy that can lead to students learning experience. However, [26] and [27] further stated one of the very important components is the peer interaction which plays a very crucial role for students learning outcome at the university level. Several researchers [4], [28]-[30] conducted studies and suggested that the social integration have an effect on the adult versus traditionally-aged students in higher education institutions [31], two-year versus four-year student in higher education institutions [4] and [19].

According to [22], "social support and close friendships form the core components of social integration. Students derive satisfaction from these social attachments…feeling supported increase[s] a student's self-confidence". However, [22] further indicated that peer interaction with academics or non-academics strongly associated with the effective study habits and academic success. Moreover, [20] stated that from the findings of the research results and concluded that "technology may allow students a greater opportunity to interact with others and to develop positive and encouraging relationships". Reference [32] stated technology integration allows university students to socially interact with each other and it is very imperative to get a very strong understand on the specific technology to the social interaction.

A study was conducted by [33] with 527 female students and their research results found social integration is the strongest variable among other variables such as self-esteem and university comfort. [34] conducted a study with 322 students and the findings indicated a greater number of friendships have an impact on the social integration, [34] also further added "a broader discussion network is better. Those students with a greater proportion of ties outside of their peer

group perform better academically and are more likely to persist…those students who possess broader, well-connected networks…are able to more easily make connections with others" [34, p. 609].

VII. Research Design

This study was survey based and a total of 242 local students participated from a public university in Canada. Questionnaire of this study was developed from the existing literature and it was validated by a framework. The entire data was collected in 2013 and it was distributed using a link to all the students. Ethical clearance was sought from the university. Data was coded and was captured on the Excel Spreadsheets and finally, it was analyzed using the WarpPLS 5.0 software. Section VII-A describes the sample, procedure and questionnaire.

A. Sample and Procedure

This study was conducted based on a questionnaire based survey within a public university in Montréal, Canada. All the students participated voluntary and they were locals (Canadians). It was assured to all students that their names will be anonymous. In Section VII-B how the questionnaire was designed is described.

B. Questionnaire

The questionnaire of this study was consisted of three sections, namely social integration (integration with peers, integration with faculty, and faculty support), technology access and use (number of technologies used per week in Quebec, frequency of technologies used in Quebec, the number of access to the Internet in Quebec, the number of Internet users in Quebec, perception of ICT skills, and Internet experience). Finally, in the sociodemographic consists of number of sessions at university, hours of work per week, gender, age, living area (urban/rural/semi-rural), ethno cultural group, mother tongue, level of education of parents and local students.

VIII. Results

A. Proposed Structural Equation Modelling (SEM)

Fig. 1 shows technology access and use has an impact on integration with faculty with a value of $\beta = -0.11$ and $p < .01$; technology access and use also has an impact on integration with faculty support with a value of $\beta = 0.12$ and $p < .01$. On the other hand, technology access and use does not have an impact on the integration with peers since the p value ($\beta = -0.00$ and $p = 0.49$) is not significant. However, the socio demographics have a strong significant impact with values of $\beta = 0.61$ and $p < .01$; $\beta = 0.23$ and $p < .01$; $\beta = 0.06$ and $p < .01$ on the integration with technology access and use. Finally, among all the three subscales faculty support have the strongest significant.

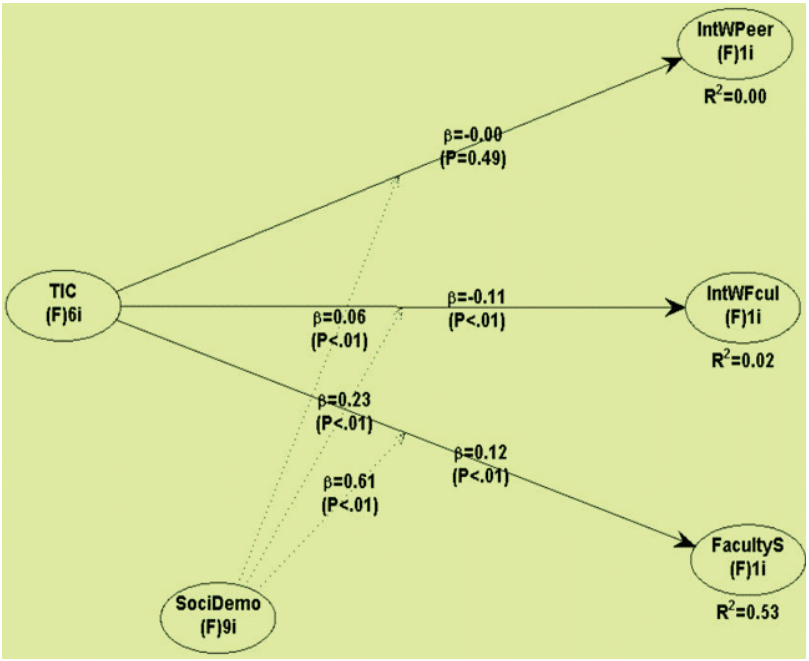

Fig. 1 Structural equation model (SEM) on the technology access and use on the social integration

B. Model Fit

According to [35], measurement model strength can be measured through the convergent and discriminant validity. The overall model fit was assessed through ten measures, namely, the Average path coefficient (APC), Average R-squared (ARS), Average adjusted R-squared (AARS), Average block VIF (AVIF), Average full collinearity VIF (AFVIF), Tenenhaus GoF (GoF), Simpson's paradox ratio

(SPR), R-squared contribution ratio (RSCR), Statistical suppression ratio (SSR), and Nonlinear bivariate causality direction ratio (NLBCDR), to show how the model is good. However, according to the [36], each of the model was discussed.

Table I shows that the technology access and use on social integration has a good fit because the ARS and AARS values are <0.001. On the other hand, AVIF value is <=5. Hence, it can be concluded that a good fit exists between the data and the model [36] and [37].

TABLE I
MODEL FIT AND QUALITY INDICES

Fit index	Model	Recommendation
Average path coefficient (APC)	0.188	Good if P=0.001
Average R-squared (ARS)	0.183	Good if P<0.001
Average adjusted R-squared (AARS)	0.182	Good if P<0.001
Average block VIF (AVIF)	21.902	Acceptable if <=5, ideally <=3.3
Average full collinearity VIF (AFVIF)	9.849	Acceptable if <=5, ideally <=3.3
Tenenhaus GoF (GoF)	0.417	Small>=0.1, medium>=0.25, large >=0.36
Sympon's paradox ratio (SPR)	0.667	Acceptable if>=0.7, ideally=1
R-squared contribution ratio (RSCR)	0.977	Acceptable if>=0.9, ideally=1
Statistical suppression ratio (SSR)	0.833	Acceptable if>=0.7
Nonlinear bivariate causality direction ratio (NLBCDR)	0.833	Acceptable if>=0.7

TABLE II
MEAN AND STANDARD DEVIATION (I. INTEGRATION WITH PEERS, II. INTEGRATION WITH FACULTY, III. FACULTY SUPPORT

Factors	Mean	Standard Deviation	Variables	Mean	Standard Deviation
I	2.40	0.78	IV	6.61	16.61
II	2.47	3.51	IV	6.61	16.61
III	3.60	12.40	IV	6.61	16.61

I: Integration with peers, II: Integration with faculty, III: Faculty support, IV: Technology access and use.

TABLE III
CORRELATION AMONG LATENT VARIABLES

	I	II	III	IV	V
I	0.969	0.055	0.118	0.716	0.908
II	0.055	(1.000)	0.007	0.068	0.036
III	0.118	0.007	(1.000)	0.166	0.107
IV	0.716	0.068	0.166	(1.000)	0.671
V	0.908	0.036	0.107	0.671	(0.924)

I: Technology access and use, II: Integration with peers, III: Integration with faculty, IV: Faculty support, V: Socio demographic.

C. Mean and Standard Deviation of Technology and Social Integration

Table II shows the mean and standard deviation of social integration and the technology access and use.

D. Correlation among Latent Variables with Square Roots of AVEs

Reference [38] stated that AVE (Average Variance Extracted) is the measurement of variance of a set of items. Table III indicates AVE values of the social integration and the technology access and use. Square roots of average variances extracted (AVEs) shown on the diagonal.

E. Analysis of the Cronbach's Alpha Coefficients, Composite Reliability Coefficients

Cronbach's alpha is used to check the consistency of the measurement items. However, according to [39], a composite reliability ranges 0.70 or bigger is considered acceptable. Table IV shows that Cronbach's alpha of all the latent variables ranged from 0.987 to 1.00 thus exceeded the recommend value of 0.70. On the other hand, the composite reliability of constructs is ranging from 0.989 to 1.00 which exceeded the recommended value of 0.70 [35]. Hence it can be concluded that all the measurement items are appropriate for the respective latent variables and reliably.

TABLE IV
RESULTS OF CRONBACH'S ALPHA AND COMPOSITE RELIABILITY COEFFICIENTS

	I	II	III	IV	V
Cronbach's Alpha	0.987	1.000	1.000	1.000	0.966
Composite Reliability	0.989	1.000	1.000	1.000	0.979

I: Technology access and use, II: Integration with peers, III: Integration with faculty, IV: Faculty support, V: Socio demographic.

TABLE V
COMBINED LOADING AND CROSS-LOADING

	I	II	III	IV	V
Item 1	**0.964**	0.000	0.018	0.038	0.083
Item 2	**0.970**	0.000	0.014	0.029	0.076
Item 3	**0.971**	-0.010	0.015	-0.031	-0.061
Item 4	**0.957**	-0.003	0.017	-0.045	-0.053
Item 5	**0.976**	0.005	-0.032	0.072	0.129
Item 6	**0.974**	0.007	-0.032	0.070	0.141
Item 7	0.000	**1.000**	-0.000	0.000	-0.000
Item 8	0.000	-0.000	**1.000**	0.000	-0.000
Item 9	0.000	-0.000	-0.000	**1.000**	-0.000
Item 10	-0.002	-0.016	-0.005	0.009	**0.987**
Item 11	0.046	-0.004	-0.001	0.005	**0.980**
Item 12	-0.018	0.013	-0.001	0.001	**0.973**
Item 13	0.000	-0.001	-0.006	0.007	**0.992**
Item 14	-0.002	0.005	0.001	0.004	**0.980**
Item 15	-0.052	-0.020	-0.001	0.004	**0.958**
Item 16	-0.001	0.007	-0.002	0.006	**0.987**
Item 17	-0.038	0.008	0.000	-0.002	**0.974**

F. Analysis of the Combined Loading and Cross-Loading

Table V shows the measurement items loaded higher for the latent variables. However, these latent variables are theoretically specified to measure than to other latent variables. According to [40], loading is from the structure matrix (unrotated) and the cross-loading is from the pattern matrix (rotated). However, [40] further indicated that structure matrix (unrotated) contains the Pearson correlations between the indicators and the latent variables. Table V further shows that all the seventeen measurement items load distinctly on the specified latent variables. According to [35], recommended loading values exceeded 0.50. Hence, it can be concluded that all the measurement items demonstrated the satisfactory level of the individual item reliability.

G. Graphs Showing the Effect of Variables

Fig. 2 shows that the relationship between the technology access and use with the faculty support is linear and it is positively supported. However, the relationship is intensified approximately 0.78 standard deviations to the right of the mean of the standardized data. On the other hand, Fig. 3 the unstandardized scale shows that the linear relationship begun to increase when the mean of the respondents is 3.60 and the standard deviations is 12.40. Hence, it can be concluded that technology access and use strongly significant on the faculty support.

Fig. 4 shows that the relationship between the technology access and use with the integration with faculty is linear and it is positively supported. The relationship is intensified approximately 0.78 standard deviations to the right of the mean of the standardized data. On the other hand, Fig. 5 the unstandardized scale shows the linear relationship begun to increase when the mean of the respondents is 2.47 and the standard deviation is 3.51. Hence, it can be concluded that technology access and use significantly affect the integration with faculty.

Fig. 6 shows that the relationship between the technology access and use with the peer is linear and it is positively supported. However, the relationship is intensified approximately 0.78 standard deviation to the right of the mean of the standardized data. On the other hand, Fig. 7 shows that the unstandardized scale indicates that the linear relationship begun to increase when the mean of the respondents is 2.40 and the standard deviation is 0.78. Furthermore, Fig. 7 clearly indicates that the standard deviation is very low and hence it is not significantly affect the integration with peers.

H. Summary of the Results

Having analyzed the structural equation model (SEM), in one hand, it clearly says that the first hypothesis (H_1) was accepted and on the other hand, the following hypothesis (H_2), (H_3), and (H_4) were rejected. However, the model also shows that the technology access and use has significant on the integration with faculty, faculty support and with the socio demographics, but the technology access and use does not effect on the integration with peers.

IX. Discussion

The novelty of this research can be attributed to the following: this study was designed to examine the impact of technology access and use by local students on the social integration; and this study could be used to as a guideline for local students to see the social integration affect by the technology access and use. Finally, this study concludes that for local students, the technology access and use effect on the integration with faculty and faculty support, but it does not affect to the integration with peers.

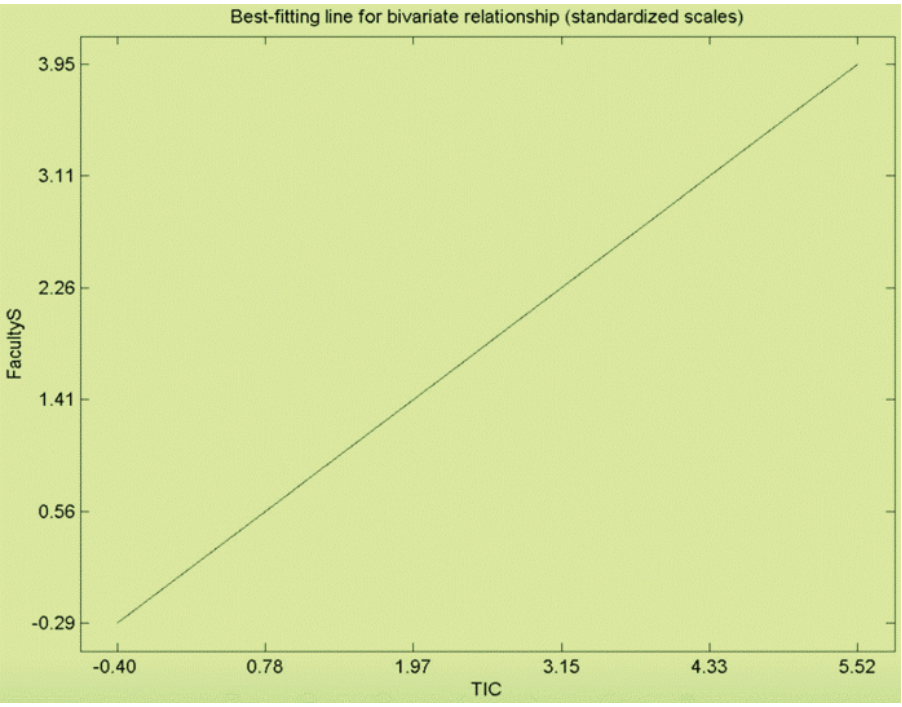

Fig. 2 Technology access and use affecting the faculty support

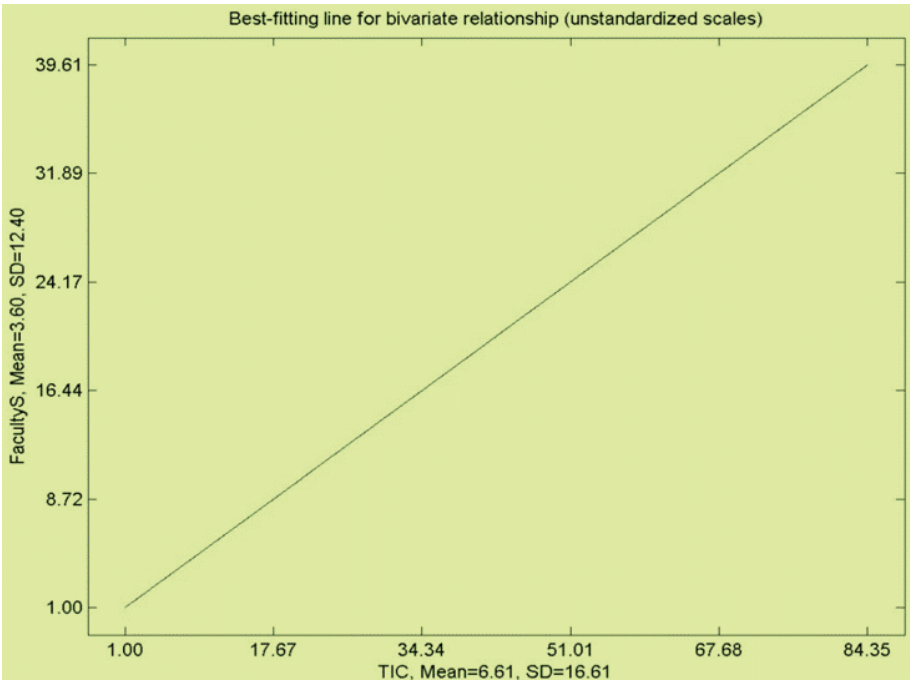

Fig. 3 Technology access and use (with mean and standard deviation) and the faculty support

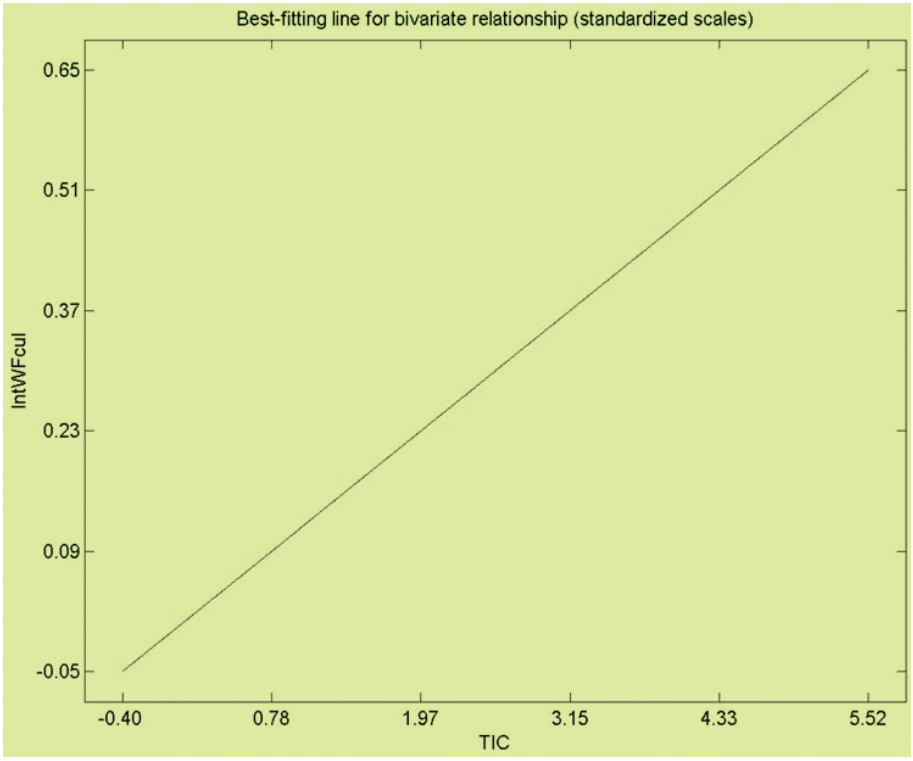

Fig. 4 Technology access and use and integration with faculty

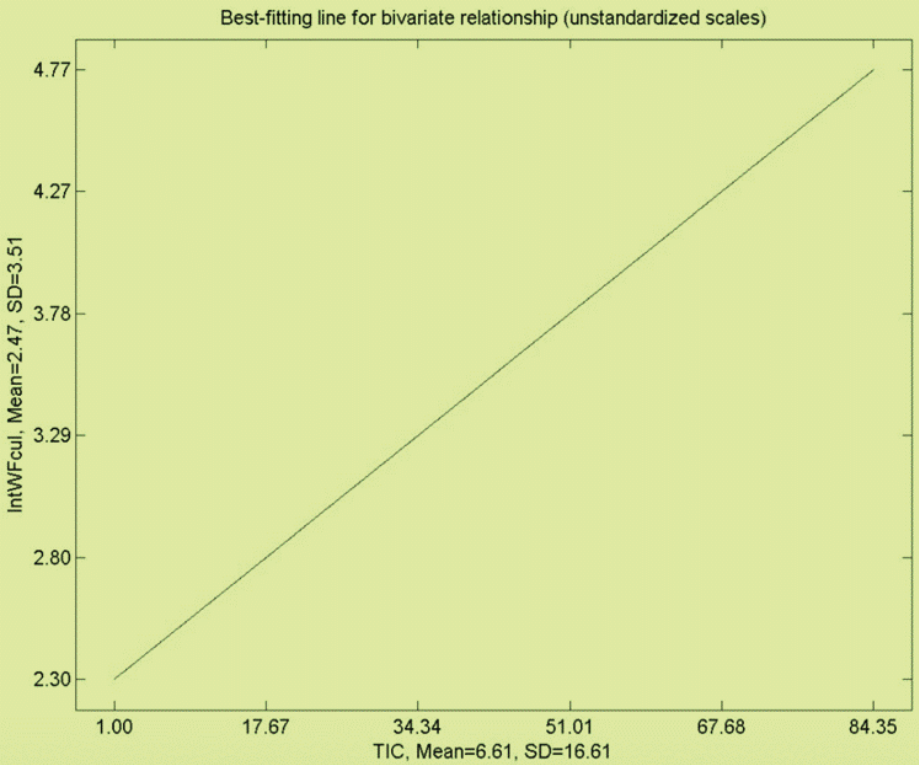

Fig. 5 Technology access and use (with mean and standard deviation) and the integration with faculty

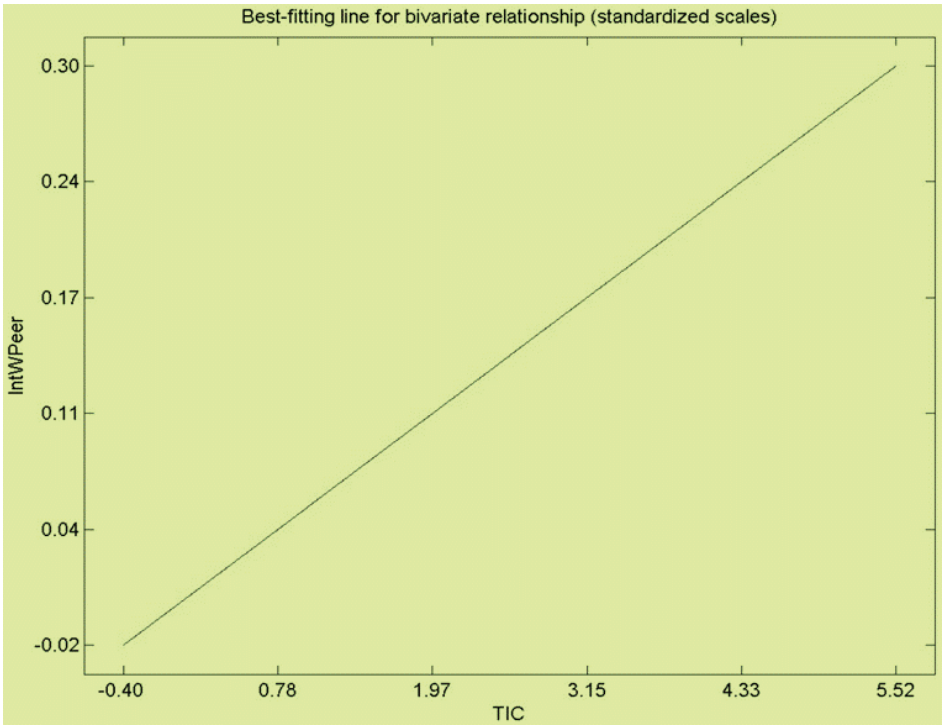

Fig. 6 Technology access and use and integration with peer

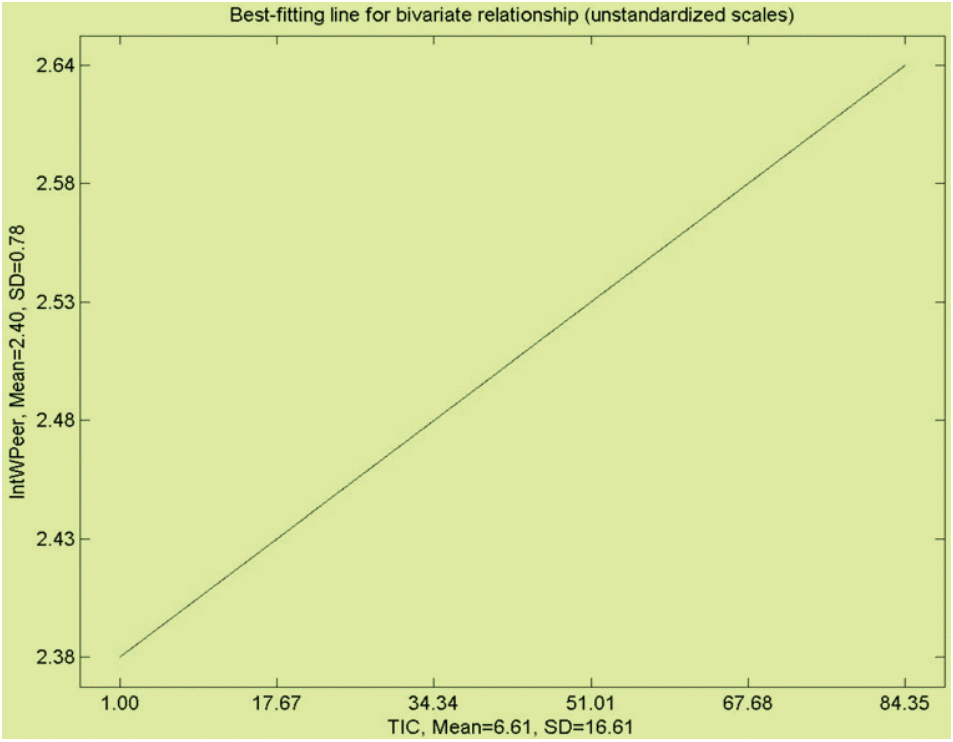

Fig. 7 Technology access and use (with mean and standard deviation) and the integration with peer

X. Conclusion

This paper presents the perceptions of local students on the technology access and use of the social integration. However, the results shown that socio demographic, integration with faculty, faculty support has impact by technology access and use, but on the other hand, technology access and use does not have an impact on the integration with peers. Since the technology access and use is not having an impact on the integration with peers hence this would be considered for the future research. Finally, this finding will help local students to know about the technology access and use on the social integration.

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