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SELF-EFFICACY AMONG UNDER GRADUATE STUDENTS OF SCIENCE AND SOCIAL SCIENCE STREAMS IN RELATION TO USAGE OF MOBILE APPLICATIONS

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Abstract:

This study investigates self-efficacy among under graduate students studying in science and social science streams in relation to usage of educational/ non educational mobile applications (with high, average and low level). Random sampling was employed on the sample of 800 students. A significant difference in self-efficacy among undergraduate students studying in different science and social science streams was found with high, average and high and low usage of educational mobile application; A significant difference in self-efficacy was found among the undergraduate students studying in science and social science streams using educational mobile applications; No significant interaction effect of Usage of Educational Mobile Applications of under graduate students studying in different courses was found on the scores on self-efficacy. A significant difference in self-efficacy among undergraduate students studying in different science and social science streams was found with high, average and high and low usage of non-educational mobile applications; No significant difference in self-efficacy was found among the undergraduate students studying in science and social science streams using non-educational mobile applications; No significant interaction effect of usage of non-educational mobile applications under graduate students studying in different streams was found on the scores of on self-efficacy.

Introduction:

The term Self-Efficacy was first developed by Bandura within his social cognitive theory. The beliefs, described by Bandura (1997), are called determinants of thought, behaviour, and feelings. Confidence in one's capabilities to execute behaviour is associated with efficacy beliefs. Our beliefs about our own self-efficacy heavily influence our motivation, our plans, and our emotional reflexes. The perceived self-efficacy that we have plays a role in how much effort and persistence we put forth, which help us overcome the barriers that get in the way of reaching our goals. In addition, Bandura (1997) mentioned the self-efficacy as one's faith in one's ability to combine and put into practice all the necessary actions to confront what is ahead. Students' sense of self-efficacy is a major factor in how they feel, behave, and think. Self-effectiveness was born by (Bandura 1997) personal belief in their ability, by their own actions, to produce desired effect. Similarly, self-efficacy is a personal belief that a person can achieve certain goals in an efficient and appropriate manner (Ormrod, 2006). Self-efficacy tends to be domain-specific, and therefore, is best assessed in relation to specific skills (Wang & Baker; 2015). Self-efficacy in

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study-related skills can predict academic performance and pleasant learning-related emotions (Putwain, Sander & Larkin; 2013). Academic self-efficacy refers to the belief that one can successfully engage in and complete course-specific academic tasks, such as accomplishing course aims, satisfactorily completing assignments, achieving a passing grade, and meeting the requirements to continue to pursue one's major course of study (Jimenez Soffa, 2006).

Mobile apps are the software applications that are designed to run on mobile devices, smart phones and tablets etc. UNESCO considers that Mobile learning has increased the reach and equality of education. These are typically available through app stores which are operated by the owners of the mobile operating system. By 2020, mobile apps are forecast to generate around 189 billion U.S. dollars in revenues via app stores and in-app advertising. Some of the most popular operating system-native stores are Apple's App Store, Google Play, as well as Windows Phone Store and BlackBerry App World. As of March 2017, there were 2.8 million available apps at Google Play Store and 2.2 million apps available in the Apple's App Store, the two leading app stores in the world. Following are the different types of apps which we are using in our routine life to manage daily affairs: Gaming Apps. World Bank and other funding institutions are taking initiatives to authorise educational policy makers to purchase tablets for school education, this would yield better results (Hamhuis et al. 2020; Nikolopoulou 2020).

Review:

Odaci (2011) found influence of students' problematic internet usage related with self-efficacy of students; Wu et.al. (2012) showed social trust mediates the association between social self-efficacy; Oakley and Palvia (2012) found mobile self-efficacy had a bigger overall influence on mobile device infusion; Yang (2012) revealed desire for English learning had increased good attitudes regarding m-learning among the majority of students. Hocevaret et.al.(2014) found that users with greater social media levels have more self-efficacy than users with lower social media levels; Jain (2016) revealed differential influence of characteristics such as 'Age,' 'Occupation,' 'Digital Literacy,' 'Earnings,' and 'Education' on internet use in a rural environment in a developing nation; Ayubet.al. (2017) revealed that mobile self-efficacy, personal innovativeness, and willingness to use MCLass impact students' views on utilising Yorganci (2017) found several key characteristics - gender, past mobile learning experience, and academic major, influenced their self-efficacy and attitudes about m-learning usage; Li et.al. (2018) found nursing students were generally motivated to perform well and learn well, but they had poor subjective pleasure and self-efficacy with mobile learning. Razzaq et. al.(2018) revealed a link between such activities and students' self-efficacy; Wang et al (2019) found higher level of physical activity applications was connected with a better degree of social support and a higher level of self-efficacy; Hwang and Jo (2019) while evaluating the effectiveness of a mobile app-based found that experimental group's average ratings for stress, emotional labour, self-efficacy, and well-being were considerably different, whereas the control group's average values; Huang and Regnier (2019) revealed that educational and skills training workshop component of the intervention produced immediate improvements on dieticians' self-efficacy; Jamil et.al. (2019)

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found that female students' self-efficacy was higher than for male; Hsu et.al. (2021) found that mobile applications used by female preschool teachers boosted their self-efficacy in order to further their professional growth.

Objectives:

1. To study the difference between under graduate students studying in science and social science streams with different level of usage of educational mobile applications.
2. To study the difference in self-efficacy of under graduate studying in science and social science streams using educational mobile applications.
3. To study the interaction effect of usage of educational mobile applications and stream of study of under graduate students studying on the scores of self-efficacy.
4. To study the difference between under graduate students studying in science and social science streams with different level of usage of non-educational mobile applications.
5. To study the difference in self-efficacy of under graduate studying in science and social science streams using non-educational mobile applications.
6. To study the interaction effect of usage of non-educational mobile applications and stream of study of under graduate students studying on the scores of self-efficacy.

Sample of the Study:

Random sampling was employed on the sample of 800 students of 1st, 2nd, or 3rd year of graduation classes of science and social science streams with high, average and low usage of mobile applications, studying in GNDU and its affiliated college of Amritsar District.

Tools Used:

1. Scale on Mobile App Usage (Constructed by the investigator).
2. Self-Efficacy Scale (SES : Singh & Narain; 2014).

Analysis and Results

1. 3X2 factorial Analysis of Variance of Usage of Educational Mobile Application in relation to Nature of Course of Undergraduate Students on self-efficacy

The mean and S.D. of usages of educational mobile applications of undergraduate Students studying in different courses, F-value has been calculated and presented in the Table 1:

Table 1: Mean scores on Self-Efficacy of Undergraduate Students studying in different courses

Educational Mobile Apps Usage

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	Stream	**Mean**	**S. D.**	**N**
High Educational Mobile Apps Usage	Science	72.38	9.25	82
	Social Science	72.57	10.21	134
	Total	72.50	9.83	216
Average Educational Mobile Apps Usage	Science	68.88	7.82	179
	Social Science	71.03	9.42	189
	Total	69.98	8.73	368
Low Educational Mobile Apps Usage	Science	67.84	8.24	131
	Social Science	68.61	10.23	85
	Total	68.14	9.06	216

Table 2: Summary of One-way ANOVA of Under-Graduate Students studying in different courses of Educational Mobile Apps Usage on Self-Efficacy

Sources of Variation	**Sum of Square**	**df**	**Mean Sum of Square**	**F-Ratio**
Educational Mobile Apps Usage (A)	1878.76	2	939.38	**11.31****
Educational Stream (B)	194.00	1	194.00	2.34
Interaction (AXB)	141.58	3	70.79	0.85
Error Term	65961.26	794	83.08	

*****Significant at 0.05 level, **Significant at 0.01 level

Analysis of Variance on the scores of Educational Mobile Apps Usage in relation to stream of Undergraduate Students on Self-Efficacy

Main Effect

A) Educational Mobile Apps Usage

It may be observed from the table 2 that the F-ratio (11.31) for difference between the mean scores of self-efficacy of high, average and low groups of educational mobile apps usage of Undergraduate students was found to be significant at 0.01 level of confidence. This indicates that different levels of educational mobile apps usage (high, average and low) do affect undergraduate students on the scores of self-efficacy.

In order to probe deeper, F-ratio was followed by t-test. The value of t-ratio for difference in mean scores of self-efficacy of Undergraduate students with different levels of Educational Mobile Apps Usage (high, average and low) groups of has been placed in table 3.

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Table 3: t-ratio for Self Efficacy of Undergraduate students with different levels of Educational Mobile Apps Usage

Variable	**High Mobile Apps Usage** **N Mean SD** **216 72.50 9.83**	**Average Mobile Apps Usage** **N Mean SD** **368 69.98 8.73**	**Low Mobile Apps Usage** **N Mean SD** **216 68.14 9.06**
High Mobile Apps Usage **N Mean SD** **216 72.50 9.83**	-	3.21**	4.79**
Average Mobile Apps Usage **N Mean SD** **368 69.98 8.73**	3.21**	**-**	2.43*
Low Mobile Apps Usage **N Mean SD** **216 68.14 9.06**	4.79**	2.43*	**-**

(Critical Value 1.96 at 0.05 and 2.58 at 0.01 level, df 798)

Table 3 shows the mean scores for self-efficacy of undergraduate students studying in different (science and social science streams) courses with high and average groups of usages of educational mobile applications. The t-value (3.21), testing the significance of mean difference on self-efficacy of undergraduate students with high and average level of usages of educational mobile applications; t-value (4.79), testing the significance of mean difference on self-efficacy of undergraduate students with high and low level of usages of educational mobile applications, and t-value (2.43), testing the significance of mean difference on self-efficacy of undergraduate students with high and low level of usages of educational mobile applications in comparison to table value was found to be significant at 0.01 level of confidence. Hence the Hypothesis "There exists no significant difference between under graduate students studying in science and social science streams with different level of usage of educational mobile applications", stands partially rejected. So, it may be inferred that there exists significant difference in self-efficacy of undergraduate students studying in different science and social science streams with high and

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average level of usages of educational mobile applications; while there exists significant difference in self-efficacy of Undergraduate students studying in different science and social science streams with average and low level usages of educational mobile applications.

Thus, it may be concluded that there is significant difference between in mean scores on of self-efficacy of Undergraduate students with high and low level of educational mobile apps usage. The result of study coincide with the earlier studies; Internets literacy level of student and self-efficacy are related (Razzaq, Samiha & Anshari; 2018); higher self-efficacy is linked to positive perspectives and feelings, to greater willingness to use mobile devices, (Nikolopoulou & Gialamas; 2017)

B) Educational Stream

It may be observed from the table 3 that the F-ratio (2.34) for difference between the mean scores on the scores of self-efficacy of Undergraduate students from different streams of study (Science and Social Science) is not found to be significant at 0.05 level of confidence. Hence the Hypothesis 2 "There exists no significant difference in self-efficacy of under graduate studying in Science and Social Science streams using educational mobile applications" is not rejected. This indicates that stream of undergraduate students' do not effect on the scores of self-efficacy. This indicates that stream of study of undergraduate students does not effect on the scores of self-efficacy.

First Order Interaction effect

It may be observed from the table 2 that the F-ratio (0.85) for interaction between Educational Mobile Apps Usage (high, average and low) and Educational Stream (Science and Social Science) in comparison to table value was found significant; as the difference between the mean scores of high, average and low groups of educational mobile apps usage of Undergraduate students on self-efficacy was found to be significant at 0.05 level of confidence. This indicates that different levels of educational mobile apps usage (high, average and low) and Educational Stream (Science and Social Science) do not affect Undergraduate students on their scores of self-efficacy.

Hence the Hypothesis No. 3, 'There exists no significant interaction effect of Educational Mobile Apps Usage and Educational Stream on Self-Efficacy of Undergraduate Students' stands rejected. Hence, it may be concluded that no significant difference in the mean scores on self-efficacy of under-graduate students due to interaction effect of Educational Mobile Apps Usage and Educational Streams, meaning thereby that the undergraduate students studying in different educational streams (Science and Social Science) scored same in their academic achievement irrespective of the high, average and low levels of non-educational mobile apps usage.

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2. ANALYSIS OF VARIANCE ON SELF-EFFICACY AND NON-EDUCATIONAL MOBILE APPS USAGE

Analysis of Variance of Self-Efficacy in relation to Non-Educational Mobile Apps Usage and stream of study (3X2 factorial Analysis)

The mean and S.D. of Educational Mobile Apps Usage of Undergraduate Students studying in different courses, F-value has been calculated and presented in the Table 2 below:

Table 4: Mean scores on Self-Efficacy of Undergraduate Students studying in different courses with Non-Educational Mobile Apps Usage

	Stream	**Mean**	**S. D.**	**N**
High Non-Educational Mobile Apps Usage	Science	72.69	8.80	104
	Social Science	73.55	9.80	112
	Total	73.14	9.83	216
Average Non-Educational Mobile Apps Usage	Science	72.50	9.83	179
	Social Science	69.98	8.73	189
	Total	69.65	8.75	368
Low Non-Educational Mobile Apps Usage	Science	67.84	8.24	116
	Social Science	68.61	10.23	100
	Total	68.14	9.06	216

Table 5: Summary of Two-way ANOVA of Under-Graduate Students studying in different courses with different Non-Educational Mobile Apps Usage on Self-Efficacy

Sources of Variation	**Sum of Square**	**df**	**Mean Sum of Square**	**F-Ratio**
Non-Educational Mobile Apps Usage (A)	1878.76	2	939.38	**31.27****
Educational Stream (B)	194.00	1	194.00	0.41
Interaction (AXB)	141.58	2	70.79	0.10
Error Term	65961.26	794	83.08	

***Significant at 0.05 level, **Significant at 0.01 level

Analysis of Variance on the scores of Non-Educational Mobile Apps Usage in relation to stream of Undergraduate Students on Self-Efficacy

Main Effect

A) Non-Educational Mobile Apps Usage

It may be observed from the table 5 that the F-ratio (31.27) for difference between the mean scores of self-efficacy of high, average and low groups of non-educational mobile apps usage of Undergraduate students was found to be significant at 0.01 level of confidence. This indicates

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that different levels of non-educational mobile apps usage (high, average and low) do affect Undergraduate students on the scores of self-efficacy.

In order to probe deeper, F-ratio was followed by t-test. The value of t-ratio for difference in mean scores of academic procrastination of high, average and low groups of Undergraduate students with different levels of Educational Mobile Apps Usage has been placed in table 6.

Table 6: t-ratio for Self Efficacy of Undergraduate students with different levels of Non-Educational Mobile Apps Usage

Variable	High Mobile Apps Usage N Mean SD 216 72.50 9.83	Average Mobile Apps Usage N Mean SD 368 69.98 8.73	Low Mobile Apps Usage N Mean SD 216 68.14 9.06
High Mobile Apps Usage N Mean SD 216 72.50 9.83	-	**4.54****	**5.64****
Average Mobile Apps Usage N Mean SD 368 69.98 8.73	**4.54****	-	**2.05***
Low Mobile Apps Usage N Mean SD 216 68.14 9.06	**5.64****	**2.05***	-

Table 6 shows the mean scores for self-efficacy of undergraduate students studying in different (science and social science streams) courses with high and average groups of usages of non-educational mobile applications. The t-value (4.54), testing the significance of mean difference on self-efficacy of undergraduate students with high and average level of usages of non-educational mobile applications; and t-value (5.64), testing the significance of mean difference on self-efficacy of undergraduate students with high and low level of usages of non-educational mobile applications, in comparison to table value was found to be significant at 0.01 level of

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confidence; whereas and t-value (2.05), testing the significance of mean difference on self-efficacy of undergraduate students with high and low level of usages of non-educational mobile applications was found to be significant at 0.05 level of confidence. Hence the Hypothesis 4 "There exists no significant difference between under graduate students studying in science and social science streams with different level of usage of non-educational mobile applications", stands partially rejected. So, it may be inferred that there exists significant difference in self-efficacy of undergraduate students studying in different science and social science streams with high and average level of usages of non-educational mobile applications; while there exists significant difference in self-efficacy of Undergraduate students studying in different science and social science streams with average and low level usages of non-educational mobile applications. It may be concluded that there exists significant difference in self-efficacy of Undergraduate students with average and low level of non-educational mobile apps usage. The results coincide with earlier work; the smartphone addiction was negatively related to academic self-efficacy (Li, Gao & Xu; 2020).

B) Educational Stream

It may be observed from the table 5 that the F-ratio (0.41) for difference between the mean scores on the scores of self-efficacy of Undergraduate students from different streams of study (Science and Social Science) was not found to be significant at 0.05 level of confidence. Hence the Hypothesis 5 "There exists no significant difference in self-efficacy of under graduate studying in Science and Social Science streams using non-educational mobile applications" is not rejected. This indicates that stream of undergraduate students' do not effect on the scores of self-efficacy. This indicates that stream of study of undergraduate students does not effect on the scores of self-efficacy. This indicates that stream of study of Undergraduate students do not effect on the scores of self-efficacy.

First Order Interaction effect

It may be observed from the table 5 that the F-ratio (0.10) for interaction between Non-Educational Mobile Apps Usage (high, average and low) and Educational Stream (Science and Social Science) in comparison to table value was found significant; as the difference between the mean scores of high, average and low groups of non-educational mobile apps usage of Undergraduate students on self-efficacy was found to be significant at 0.05 level of confidence. This indicates that different levels of non-educational mobile apps usage (high, average and low) and Educational Stream (Science and Social Science) do not affect Undergraduate students on their scores of self-efficacy. Hence the Hypothesis 6, 'There exists no significant interaction effect of Non-Educational Mobile Apps Usage and Educational Stream on Self-Efficacy of Undergraduate Students', stands rejected. It may be concluded that no significant difference was found in the mean scores on self-efficacy of under-graduate students due to interaction effect of Non-Educational Mobile Apps Usage and Educational Streams.

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Findings:

1. A significant difference in self-efficacy among undergraduate students studying in different science and social science streams was found with high and average, high and low as well as with average and low usage of educational mobile application was found among undergraduate students.
2. A significant difference in self-efficacy was found among the undergraduate students studying in different science and social science streams.
3. No significant difference in the self-efficacy of under-graduate students due to interaction effect of usage of educational mobile application and different science and social science streams of students was observed.
4. A significant difference in self-efficacy among undergraduate students studying in different science and social science streams was found with high and average, high and low as well as with average and low usage of non-educational mobile application was found among undergraduate students.
5. No significant difference in self-efficacy was found among the undergraduate students studying in different science and social science streams of students.
6. No significant difference in the mean scores on self-efficacy of under-graduate students due to interaction effect of usage of non-educational mobile application and different science and social science streams of students was observed.

Educational Implications:

The higher education institutions to foster self-efficacy among students should bring interventions through a massive open online course on study skills by focusing on undergraduate students' beliefs about their capabilities to produce expected achievement. They should be taught online techniques to know about effective goal-setting to increase self-efficacy across a range of areas. They should be made expert to sort our priorities, make better plans and focus on them more efficiently on planning out on career trajectory.

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