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Knowledge Sharing Channels used by Medical Students in Pakistan

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Abstract

Purpose: This study aimed at exploring the preferred and effective communication channels used by medical students, and the reasons for choosing these for knowledge sharing (KS).

Method: A survey questionnaire was used to collect the data from voluntarily participated 194 undergraduate medical students selected by proportional stratified simple random sampling technique from the University College of Medicine of The University of Lahore. A total of 149 (77%) questionnaires were returned.

Findings: Some major findings showed that the medical students mostly preferred and considered *face-to-face* and *SMS* (Short Messaging Services) effective communication channels for KS. They used these channels due to their convenience and accessibility. Female students preferred *face-to-face* and *telephonic* conversation an effective communication media for KS as compared to male students.

Originality / Value: There was a lack of studies focusing on the communication channels used by medical students for KS. It was important to explore various communication channels used by medical students as they were likely to join the workforce after their graduation. The findings will support students to achieve better performance by knowing the importance and value of channel richness to improve learning in their learning environment.

Keywords: Knowledge sharing, Communication channels, Medical students, Pakistan.

Introduction

The concept of knowledge-based societies and knowledge-based economies has been emerging for some time where knowledge is regarded as a critical resource because of *knowledge loss* (Liyanage et al., 2009). And sharing knowledge has become the most vital activity to prevent this loss. Generally speaking, sharing knowledge is about communicating knowledge with one another using various communication channels. Thus communication channel is a significant element of communication which is like giving an injection: "a sender encodes ideas and feelings into some sort of message and then conveys them to a receiver who decodes them" (Adler and Rodman, 2006, p. 12). Therefore, communication channels can be understood simply as the modes or pathways through which two individuals might communicate. Kwok and Gao (2005) described the importance of communication channels for KS and its richness in these words.

> Knowledge sharing is conducted via some channels that act as connections between the partners of sharing and facilitate the transfer of knowledge from source to target. Therefore, the availability and the richness of such channels may impact the success of knowledge sharing to some extent. (p. 46)

Students are considered as the most effective and efficient knowledge sharers of any society. They share a range of information and knowledge with their fellows during their study period in their academic institutions. Since the KS culture is growing ever more, so the importance of communication channels for KS is also increasing day-by-day in the highly complex and dynamic academic environment. KS becomes greater when it is shared among students (Hooff and Ridder, 2004)**.** Students who get involved in KS are expected to get more insights about their lessons, concepts and practical applications; and consequently enhance their levels of expertise and learning (Lichtenthaler and Ernst, 2006). The rapid growth and application of Information and Communication Technologies (ICTs) in every field has influenced the ways students interact with each other. They use diverse channels of communication for sharing their information, experiences and knowledge with each other. They choose and prefer channels for KS on the basis of their ability to convey messages and fast feedback (Yuen and Majid, 2007). They use different media to communicate their knowledge and information with their fellows than those media used before. The medical students are supposed to be a significant segment of the society because they join the workforce after completing their degree. Many studies have been conducted to investigate the KS behavior of students, but there is a lack of studies which specifically focus on the use of communication channels used for KS by medical students. Therefore, it was considered important to study the use of communication channels by these students.

Mostly students share a lot of tacit and explicit knowledge with their fellows via different means of communication. Only limited work has been done on the KS channels used by medical students. Scholars argue that social interactions and group activities encourage knowledge sharing among students (Wei et al., 2012). This study was important because it would add new knowledge in the area of Knowledge Management (KM) and Communication Studies. It would also put new inferences in the literature in Pakistani perspective. This study would also serve as a future reference for researchers on the subject. It would help the management of medical colleges to play an important role in encouraging their students to share knowledge by means of putting emphasis on collaborative learning, and knowing the importance of channels richness in reducing the competition among students.

Research Objective and Questions

The objective of this study was to investigate the channels of communication used by the medical students for KS. The following research questions were framed to achieve this objective.

1. What communication channels do the undergraduate medical students prefer for knowledge sharing?
2. What was their perception about the effectiveness of these communication channels?
3. Why do these medical students choose the communication channels used by them for KS?

Delimitations and Limitations of the Study

The present study specifically focuses on medical students' perception regarding KS channels. There are many channels used to share knowledge but, five communication channels from the studies by Majid and Panchapakesan (2015); and Majid and Wey (2011) are chosen. There might be many other communication channels used for KS which were not addressed in this study. Furthermore, this study did not cover the knowledge which was related to their personal life activities. It only included the sharing of educational knowledge. The present study was conducted on a private medical college, therefore, its results may not be generalized to other public and private medical colleges.

Literature Review

Knowledge and Knowledge sharing

Knowledge, a vast abstract notion, has been defined by numerous scholars over decades. Nonaka (1994, p. 15) says that "knowledge is a multifaceted concept with multilayered meanings and it is a justified belief that increases an entity's capacity for effective action". Starbuck (1992) defines knowledge as the stock of expertise; whereas Purser and Pasmore (1992) suggest that knowledge is a mixture of schemes, models, facts, institutions, ideas and opinions which are used to make decisions. Ruggles (1998) proposes that the combination of information, experience, value standard, and norm is knowledge. Rehman (2000, p. 20) describes that "knowledge is having information about, knowing, understanding, being acquainted with, being aware of, having experience of, or being familiar with something, someone or how to do something".

Knowledge sharing (KS) is a vital component and mostly argued activity of knowledge management which comprises on social interactions and interpersonal relationships. The term KS has been defined by researchers and practitioners from their own perspective and point of view. For instance, Bock et al., (2005) stated that people shared their information, knowledge and skills with their colleagues expecting, mutually, to receive others' knowledge in return which regarded it as a type of social exchange. In educational context, the term KS is defined as "the dissemination or exchange of explicit or tacit knowledge, ideas, experiences or even skills from one individual to another individual student or group of students. Thus, it requires the student or group of students to interact with each other either through face-to-face or non-physical contact means" (Wei et al., 2012, p. 329). KS and KT (Knowledge Transfer) are being used as exchangeable terms by researchers (Chennamaneni, 2006). Generally, KS and KT are and have been used synonymously in literature but there are also differences between them. Boyd, Ragsdell, and Oppenheim (2007) distinguished between KS and KT; and defined both concepts differently. They described the KT process as "applying existing knowledge from one context to another" (p. 139). This implies that the flow of knowledge occurs in one direction: from the owner to the recipient(s) (Ali, 2009). On the contrary, KS is a "two-way, mutual and voluntary process that generally occurs during social and informal interactions among organization's employees (Dong et al., 2017). The process involves one or several owners and one or more recipients, and each party involved in the process can be a knowledge owner and a recipient simultaneously" (Boyd et al., 2007, p. 140); the knowledge flow in this process occurs in all directions (Ali, 2009).

Knowledge sharing in Higher Education

In higher education, interactive role of students is becoming an emerging style of learning with its unique characteristic of joint effort. It creates motivation and commitment to build the relationship which is necessary for effective KS. KS among students plays an important role in their learning and development; and it has received a considerable attention from academic researchers. KS influences students' knowledge creation, their learning, performance, achievement, growth, and competitive advantage. KS has become an important contributory factor of success for students. Ikhsan and Rowland (2004) assert, students can enhance their decision making power, problem solving skills and group interactions by KS, which benefits them in academic environment as well as at their workplace. There are a lot of factors that motivate the

students to share their knowledge with their fellow students. Among these, trust, mutual understanding, attitude, relationship, and ICT use were most common factors. Nisar ul Haq and Haque (2018) explored that trust level, attitude of the students and use of ICTs boosted up KS amongst students. Al Rebdi (2018) determined the impact of social networks on KS and found that students shared educational sources with other students using social networks. It positively affects students' scientific learning.

Knowledge Sharing Channels

The term *channel* has different connotations with respect to its usage. This term was first used in 1300 A.D. as *Chanel*, meaning "the hollow bed of running water" (Burchfield, 1989, p. 19). The term *channel* which means "To convey through (or as through) a channel" (p. 20) used in 1648 is closer to the current meaning of communication channel. Cambridge Dictionary (2018) defines channel as "a way of communicating with people or getting something done" (para. 3). Thus *communication channel* has been defined as "the imparting, conveying, or exchange of ideas, knowledge, information etc. (weather by speech, writing or signs). Hence the science or process of conveying information, especially by means of electronic or mechanical techniques" (p. 578).

Communicating and sharing knowledge with one another is an important activity of the students. There are several factors that influenced the way the students share their knowledge with each other. Amongst these factors, *communication channel* has been addressed extensively in previous studies (Majid et al., 2014; Terzieva, 2014; Al-Saifi et al., 2016; Wen and Qiang, 2016). Yuen and Majid (2007) found that students exchanged and shared their work related assignments with peers using *internet* and it was the most common communication channel for KS among the students. Suhail and Bargees (2006) opined that internet was used for huge educational benefits. For instances, by gaining access to the latest information and material available on internet, students can improve their studies; and can also establish worldwide educational and academic links. One of the educational benefits of internet is sharing of information and knowledge among the students. Burke and Sulaiman (2011) identified that Web 2.0 technology such as *weblogs* and *Facebook* were mostly used communication media for KS among students.

Chiu (2010) wanted to know the most utilized communication channels for KS accessing the human-centered knowledge sources. He identified that *face-to-face*, *MSN*, and *e-mail* were used as communication media to exchange knowledge; where *face-to-face* communication channel was mostly used source of communication for KS than MSN and email. Wei et al. (2012) and Yuen and Majid (2007) claimed that students preferred their peers as one of the most useful sources of communicating and sharing ideas, experiences and knowledge. Due to common understanding of the task, they usually consulted their peers to get information and knowledge related to their studies. They mostly preferred face-to-face communication than E-mail, online chat, telephone and online message board. Rahman (2011) conducted a study exploring the sources of communication for KS. He identified that internet and tele / video conferencing were mostly used communication sources to share knowledge among researchers and students. He found that the provision of proper KM applications and collaborative learning of software enhanced KS among the participants.

Snyder and Lee-Partridge (2013) carried out a study to understand the information and communication channel (ICC) choices in team KS. They concluded that the respondents mostly relied on *face-to-face* interactions, followed by *telephone* and *e-mail* for sharing knowledge. They

concluded that the type of information and knowledge being shared affected ICC choice. They further identified that reliability of sources, ease of use, and convenience or accessibility also motivated the selection of ICC for KS.

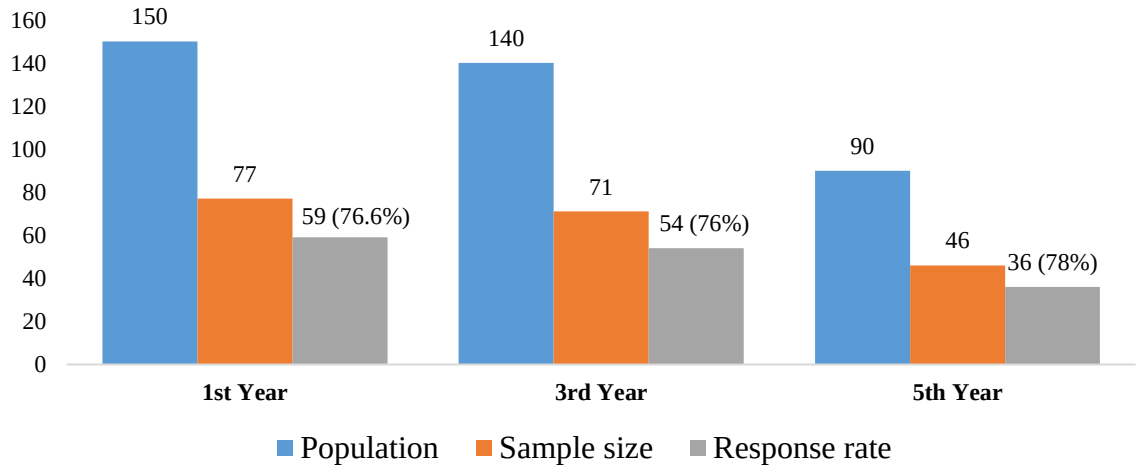
Research Design and Methodology

Quantitative research approach was employed in this study to answer the research questions. A self-administered questionnaire was used to collect data from 194 out of 380 currently enrolled MBBS (Bachelor of Medicine and Bachelor of Surgery) first, third and fifth year students of the University of Lahore (UOL) selected by proportionate stratified simple random sampling technique. Medicine is a high risk field in which an error may lead to some serious consequences. Therefore, the latest knowledge is applied and shared among the practitioners and as well as among students of this domain. Medical academic institutions, particularly, are supposed to be knowledge extensive institutions in which students share a plenty of information and knowledge with their peers during their study period. That is why MBBS students were chosen as participants (Hámornik and Juhász, 2010). The communication channels discussed in this study were adopted from the studies conducted by Majid and Panchapakesan (2015); and Majid and Wey (2011), as these channels are mostly used channels for KS. The sample size was obtained using formula of Yamane (1967). The proportion was calculated as per the following formula:

Proportion = (Sample size / Total population) × 100 = (194 / 380) × 100 = 0.51 × 100 = 51 %

All statements in the questionnaire were measured using 5-point Likert type scale. To check the internal consistency, Cronbach's Alpha was used and the resulting value was 0.819. The population, sample size, and response rate are figured out in Figure 1.

Figure 1: Population, Sample Size and Response Rate



Ethical Considerations

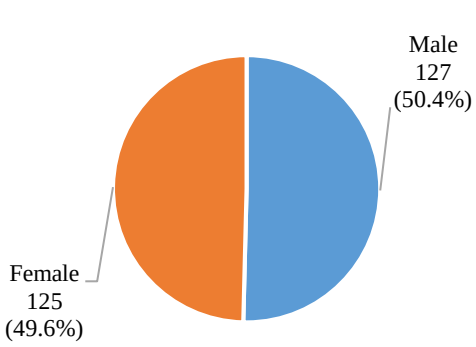
All ethical considerations were possibly considered and given due importance in this study. The participants of this study voluntarily participated without offering any incentive. The librarian(s) of the institution played a vital role in collecting data after getting permission from administration of the respective institution.

Results

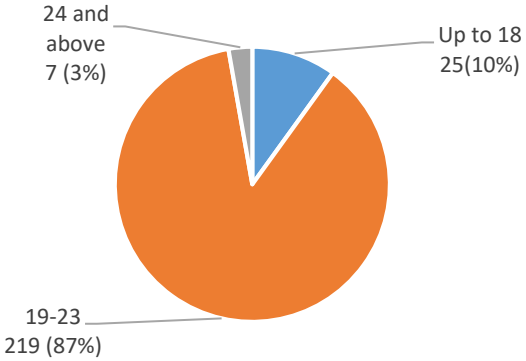
Demographic Information

The first section of the instrument consisted of respondents' demographic information, the details of which are presented in the Figure 2. The distribution of the respondents by gender is slightly in favor of males with 50.4% compared to 49.6% for females.

Figure 2: Respondents by gender and age group



Gender wise distribution



Age group wise distribution

The distribution of the respondents by age group shows that a large majority (86.9%) falls in the age-group of 19-23 while 10.3% are 'Up to 18' years. A very small number (2.8%) is in the age group of '24 and above'.

Communication Channels for Knowledge Sharing

'What communication channels do these students prefer for knowledge sharing'? The data presented in the following sections were collected on 'preference for', 'effectiveness of', and 'reasons for' using these channels.

Preferred communication channels. The respondents were given seven communication channels to indicate their preferences. The data were presented in Table 1.

Out of the seven listed channels, *face-to-face* got the highest mean score (3.73) and ranked first with the preference of a majority of the students (n = 105, 70.9%). It is interesting that 90 (61.6%) students showed their opinion that they preferred *Short Messaging Services (SMS)* for KS ranked second with a mean score of 3.58. Out of respondents, 57% preferred *social media tools* like Facebook, Twitter, and WhatsApp to share their knowledge with their peers (M = 3.45, SD = 1.019); while the least preferred channel was *email* with a mean score of 2.95 for whom 32% students opined that they did not prefer it for KS.

Table 1: *Preferred communication channels for knowledge sharing (N = 149)*

Sr. #	Preferred Communication Channels	n	1	2	3	4	5	Mean	SD*	Rank
a.	Face-to-face	148	20	10	13	52	53	3.73	1.368	1
b.	Short Messaging Service (SMS)	146	4	17	35	70	20	3.58	.960	2
c.	Online professional groups/ forums	149	5	24	34	66	20	3.48	1.024	3
d.	Social media (Facebook, Twitter, Skype etc.)	148	6	23	35	67	17	3.45	1.019	4
e.	Telephone	148	7	27	44	55	15	3.30	1.033	5
f.	Instant messaging	148	7	22	60	47	12	3.24	.964	6

g.	Email	147	16	31	58	29	13	2.95	1.097	7

Scale: 1 = Not preferred at all, 2 = Not preferred, 3 = No opinion, 4 = Preferred, 5 = Very much preferred, SD* = Standard Deviation

Independent sample t-test results. The independent sample *t*-test was used to see the gender effect on preference of communication channels for KS with an alpha level of 0.05. Significant differences of opinions were observed for three channels as presented in Table 2.

There were significant differences of opinions between male and female medical students for four channels '*face-to-face'* (*p*=.002) with the dominance of female opinions (M = 4.11). It seems that female students prefer *face-to-face* communication due to cultural environment where females feel more comfortable and accessible to females rather than males. Significant difference of opinion was also observed on *social media (Facebook, Twitter, etc.)* (*p*=.012); *instant messaging (Yahoo, MSN, etc.)* (*p*=.006); and *online professional groups / forums* (*p*=.035) with a higher mean scores for males.

Table 2: *Preferred communication channels for KS with t-test (N = 149)*

Sr. #	Preferred Communication Channels	Male		Female		*t*-test Sig. (2-tailed)
		Mean	SD	Mean	SD	
a.	Face-to-face	3.45	1.477	4.11	1.103	.002
b.	Telephone	3.30	1.090	3.30	.955	.983
c.	Email	2.94	1.106	2.95	1.093	.955
d.	Short Messaging Services (SMS)	3.62	.926	3.52	1.010	.541
e.	Social media (Facebook, Twitter, Skype, etc.)	3.62	.991	3.20	1.014	.012
f.	Instant messaging	3.42	.926	2.98	.967	.006
g.	Online professional groups/forums	3.63	.941	3.27	1.104	.035

Scale: 1 = Not preferred at all, 2 = Not preferred, 3 = No opinion, 4 = Preferred, 5 = Very much preferred

One-way ANOVA results. One-way ANOVA test was used to see the difference of opinion among 1st, 3rd, and 5th year medical students on their preference for choosing communication channels for KS with a criterion level of 0.05. Significant differences of opinions were observed for three channels as presented in Table 3.

Table 3: *Preferred communication channels for KS with One-way ANOVA*

Sr. #	Preferred communication channels	Year of study						F value	Sig.
		1st		3rd		5th			
		Mean	SD	Mean	SD	Mean	SD		
a.	Face-to-face	3.22	1.548	3.84	1.189	4.59	.500	13.076	.000
b.	Telephone	2.95	1.026	3.49	1.173	3.53	.507	5.375	.006
c.	Email	2.67	1.156	3.35	1.163	2.91	.712	5.447	.005
d.	Short Messaging Service (SMS)	3.45	.959	3.76	.992	3.53	.825	1.518	.223
e.	Social media (Facebook, Twitter, Skype etc.)	3.27	1.096	3.55	1.083	3.68	.535	2.013	.138
f.	Instant messaging	3.31	1.052	3.31	.927	3.09	.793	.711	.493
g.	Online professional groups/ forums	3.60	.993	3.57	1.063	3.35	.884	.714	.492

Scale: 1 = Not preferred at all, 2 = Not preferred, 3 = No opinion, 4 = Preferred, 5 = Very much preferred

A significant difference of opinion was found on *face-to-face* (F = 13.076, p = .002) communication channel. Other significant differences were observed on *telephone* (F = 5.375, p = .006) with high mean scores of fifth year students (3.53); and *email* (F = 5.447, p = .005) having a high opinion of 3rd year students as preferred communication channels for KS.

Post-hoc Tukey HSD test indicated that there was statistically difference on *face-to-face* communication for KS between first and third year (p = .030 < .05); and between first and fifth year students (p = .000 < .05). The findings showed that third year and fifth year students mostly preferred *face-to-face* communication for KS as compared to first year students. A *post hoc Tukey test* also indicated a statistically significant difference on *Telephonic* communication for KS between 1st and 3rd year (p = .008 < .05); and 1st and 5th year students (p = .003 < .05). Another statistically significant difference was observed on *Email* as a communication mean for KS between 1st and 3rd year (p = .002 < .05) students (Table 3.1).

Table 3.1: *Post Hoc HSD Tukey Test on Preferred communication channels for KS*

Sr. #	Preferred communication channels	Year of Study (I)	Year of Study (J)	Mean Difference (I-J)	SE	*p*
a.	Face-to-face	1st	3rd	-.608*	.237	.030
		1st	5th	-1.431*	.269	.000
b.	Telephone	1st	3rd	-.640*	.210	.008
		1st	5th	-.632*	.188	.003
c.	Email	1st	3rd	-.700*	.202	.002

* The mean difference is significant at the 0.05 level.

Effective communication channels for knowledge sharing. The respondents were asked about the effectiveness of the seven listed communication channels for KS. Their opinions are presented in Table 4.

A majority of the respondents 100 (67.5%) believed in *face-to-face* communication as a most effective channel for KS with the highest mean score of 3.75 ranking it first amongst other listed seven channels. *Social media* like Facebook, twitter; and *telephone* were less effective channels for KS. *Instant messaging (IM)* (Yahoo, MSN, etc.) received the lowest mean score of 3.23 ranking seventh position; in which, 58 (39.7%) respondents perceived effective and 41 (16.7%) did not perceive it effective channel for KS. It was surprising that 59 (40.4%) respondents had no opinion about IM.

Table 4: *Effective communication channels for knowledge sharing (N = 149)*

Sr. #	Effective communication channels	n	1	2	3	4	5	Mean	SD*	Rank
a.	Face-to-face	148	11	15	22	52	48	3.75	1.223	1
b.	Short Messaging Service (SMS)	148	5	18	33	68	24	3.59	1.009	2
c.	Telephone	149	6	15	47	67	14	3.46	.941	3
d.	Social media (Facebook, Twitter, Skype etc.)	149	7	15	52	59	16	3.42	.973	4
e.	Email	146	8	15	63	43	17	3.32	.995	5
f.	Online professional groups/ forums	147	6	30	44	48	19	3.30	1.063	6

g.	Instant messaging	146	6	23	59	48	10	3.23	.938	7

Scale: 1 = Not effective at all, 2 = Not effective, 3 = No opinion, 4 = Effective, 5 = Very much effective SD* = Standard Deviation

Independent sample t-test results. The independent sample *t*-test was applied to see the gender differences on the effectiveness of communication channels for KS with an alpha level of 0.05. The results showed that there was a significant difference of opinions between male and female medical students on two of seven communication channels (Table 5).

A significant difference was observed on *face-to-face* (p = .034), where female students had a higher mean score of 4.00 than males (M = 3.57). Another channel *instant messaging* (Yahoo, MSN) showed significant difference of opinion having the dominance of male's opinion with a mean score of 3.36 than female students.

Table 5: *Effective Communication Channels for Knowledge Sharing with t-test*

Sr. #	**Effective communication channels**	Male		Female		*t*-test Sig. (2-tailed)
		Mean	SD	Mean	SD	
a.	Face-to-face	3.57	1.213	4.00	1.201	.034
b.	Telephone	3.48	.975	3.42	.897	.687
c.	Email	3.44	1.069	3.13	.853	.055
d.	Short Messaging Services (SMS)	3.72	.990	3.42	1.017	.073
e.	Social media (Facebook, Twitter, Skype, etc.)	3.48	.987	3.32	.954	.324
f.	Instant messaging	3.36	.949	3.03	.894	.034
g.	Online professional groups/forums	3.23	1.081	3.39	1.037	.368

Scale: 1 = Not effective at all, 2 = Not effective, 3 = No opinion, 4 = Effective, 5 = Very much effective

One-way ANOVA results. One-way ANOVA test was used to see the difference of opinion among 1st, 3rd, and 5th year medical students on effectiveness of communication channels for KS with a criterion level of 0.05. Significant differences of opinions were observed for four channels as presented in Table 6.

Table 6: *Effective Communication Channels for KS with One-way ANOVA*

Sr. #	Effective communication channels	Year of study						F value	Sig.
		1st		3rd		5th			
		Mean	SD	Mean	SD	Mean	SD		
a.	Face-to-face	3.41	1.367	3.82	1.053	4.49	.507	10.365	.000
b.	Telephone	3.19	.892	3.61	1.060	3.74	.505	5.087	.007
c.	Email	3.07	1.007	3.53	1.102	3.49	.562	3.498	.033
d.	Short Messaging Service (SMS)	3.31	.948	3.86	1.114	3.69	.718	4.395	.014
e.	Social media (Facebook, Twitter, Skype, etc.)	3.24	1.148	3.57	.944	3.46	.657	1.542	.218
f.	Instant messaging	3.26	.828	3.25	1.129	3.00	.767	.991	.374
g.	Online professional groups/ forums	3.30	1.093	3.43	1.171	3.26	.852	.336	.715

Significant of differences of opinion were observed on *face-to-face* (F = 10.365, p = .000) and *telephone* (F = 5.087, p = .007) as a communication channels for KS. There were also significant differences of opinion on *Email* (F = 3.498, p = .033) and *Short Messaging Service (SMS)* (F = 4.395, p = .014) with higher mean scores of third year students.

A *Tukey post hoc* test result revealed a significant difference between first and fifth year students (p = .000); and between 3rd and 5th year students (p = .008) on *face-to-face* communication channel. The findings showed that 5th year students considered *face-to-face* and *telephone* as a most effective communication channel for KS as compared to first and third year students. Further, the findings revealed that third year students considered *Email* and *Short Messaging Service (SMS*) as effective communication media for sharing their information and knowledge (Table 6.1).

Table 6.1: *Post Hoc Tukey Test for Effective communication channels for KS*

Sr. #	Effective communication channels	Year of Study (I)	Year of Study (J)	Mean Difference (I-J)	SE	*p*
a.	Face-to-face	1st	5th	-1.133*	.243	.000
		3rd	5th	-.755*	.248	.008
b.	Telephone	1st	5th	-.564*	.194	.012
c.	Email	1st	3rd	-.474*	.186	.032
d.	Short Messaging Service	1st	3rd	-.511*	.186	.019

* The mean difference is significant at the 0.05 level.

Reasons for using various communication channels for KS. The respondents were asked about the reasons they considered while using various types of communication channels for KS. They were given four reasons for each channel asking to select up to a maximum of three for each (Table 7).

Table 7: *Reasons for using various communication channels (Multi responses)*

Sr. No.	Communication Channels	Reasons (No. of respondents)			
		Convenience or Accessibility	Minimal distortion of message	Minimal time lag for responses	Allow for personal and warm conveyance
a.	Email	35	46	75	21
b.	Face-to-face	73	42	64	26
c.	Online professional groups/forums	48	39	69	26
d.	Short Messaging Services (SMS)	33	43	69	32
e.	Social media (Facebook, Twitter, Skype, etc.)	61	43	52	19
f.	Instant messaging	33	67	55	20
g.	Telephone	39	78	41	30

The *minimal time lag for responses, convenience or accessibility* and *minimal distortion of message* were mentioned more frequently used communication channels for KS following by *allow for personal and warm conveyance*. They considered *online professional groups / forums, Short Messaging Service (SMS), social media (Facebook, Twitter, etc.)* and *instant messaging (Yahoo, MSN, etc.)* for KS because of minimal time lag for responses; and convenience or accessibility. Out of total, 78 respondents used *telephone* for sharing their knowledge due to its minimal distortion in transferring / receiving the messages.

Discussion

The use of communication channels for sharing information, knowledge, experiences, or even ideas have been an interesting phenomenon among the students. Earlier research had indicated that *face-to-face* communication was always considered to be the richest medium (Rehman, 2005). Majority of the medical students, in this study, preferred *face-to-face* communication for KS. Snyder and Lee-Partridge (2013) believed that individuals preferred *face-to-face* communication because of less chances of 'miscommunication'. This channel also allows them to direct information to a specific audience. Majid and Wey (2011) and Wei et al. (2012) depicted in their studies that *face-to-face* communication was the most important medium for KS among students. Mischen and Jackson (2008) are also in a view that *face-to-face* communication creates social interactions among the sharers by enhancing decision making practices, providing messaging consistency, and setting up various social linkages. Short Messaging Services (SMS) was also preferred communication channel for sharing knowledge among medical students. Ng'ambi (2006) observed that SMS was the most common and frequently used mobile service to possibly reach all mobile users. He also concluded that SMSs were being used among students to collaborate with each other by sharing their information and knowledge. The use of *social media* (Facebook, Twitter, etc.), *telephone,* and *instant messaging* (Yahoo, MSN, etc.) were also a preferred channel to share knowledge among medical students. Buhari et al., (2014) explored that students mostly used *social media* and *instant messaging* like Facebook, Twitter, WhatsApp etc. to share information and knowledge with each other. Rocha and de Castro (2014); Von Muhlen and Ohno-Machado (2012); and Peluchette and Karl (2008) and Al Rebdi (2018) also observed that medical students highly used social media for KS with each other.

The findings indicated that female medical students preferred *face-to-face* communication for sharing their information and knowledge. Whereas, male students favored *online professional groups / forums* for KS. *Telephonic communication* was also chosen as a preferred channel for KS by females. Perhaps, females used telephone more due to the social and cultural limitations. They do not meet their fellow students after leaving the campus and use telephone to contact their fellows for KS. The results of one-way ANOVA test revealed that fifth year students considered *face-to-face* and *telephone* as a preferred communication channels for KS. While, third year students preferred *emailing* to share their knowledge with other students.

Similarly, medical students opined that *face-to-face* and *social media* (Facebook, WhatsApp, etc.) were effective communication channels for KS. The findings reveal that *face-to-face* communication is one of the most preferred and effective channels for KS. While *instant messaging* i.e. Yahoo, MSN, etc. are the least preferred and effective communication media to share knowledge with their peers. The utilization of *social media* (Facebook, Twitter, etc.), *telephone* and *online professional groups/ forums* for KS are also considered less effective channels by medical students. Ordan (2007) and Wei et al. (2012) revealed that *face-to-face* communication was one of the most effective channels for KS among students. The findings

indicated that fifth year students considered *face-to-face* and *telephone* the most effective communication channel for KS as compared to first and third year students. Furthermore, third year students considered *Email* and *Short Messaging Service (SMS*) effective communication media for sharing their information and knowledge.

The students were also asked about the reasons behind choosing these communication channels. They responded that *minimal time lag for responses, convenience or accessibility,* and *minimal distortion of message* were the main reasons to choose these channels for KS. The results showed that these students preferred those communication channels which were easily accessible and took less time to respond. These findings are similar to those of Ordan (2007) and Majid, and Wey (2011) that students give preference to those communication channels to share information and knowledge which are easily accessible, able to transmit messages instantly, and cause minimum distortion during the transmission.

Conclusions and Recommendations

The study explored communication channels used by medical students and concluded that the undergraduate medical students mostly considered *face-to-face* and *SMS* (Short Messaging Services) as preferred and effective communication channels for KS; while they less preferred *Email* and *Instant Messaging* (Yahoo, MSN, etc.) for KS. Female students preferred and considered *face-to-face* and *telephonic* conversation an effective communication media for KS as compared to male students. For KS purposes, fifth and third year medical students most preferred *face-to-face* and *telephone* as communication means as compared to first year students. Medical students chose *face-to-face* communication due to its convenience or accessibility; and *E-mail* due to minimal time lag for responses. They selected *telephone* as a channel for KS because of minimal distortion of message. Furthermore, these students preferred those communication channels which were easily accessible and took less time to respond. Al-Saifi et al., (2016) found that using multiple communication channels for KS facilitated to enhance the communication styles, brainstorming and problem solving, learning and teaching, and training and consultations. Such kind of studies should be conducted on the students of other disciplines like engineering, social sciences, law, etc. A comparative study should also be carried out to examine the comparison among students of various kinds of disciplines to know the cultural influences on their media choices for KS.

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