European Journal of Contemporary Education
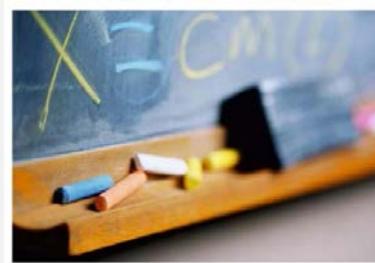
ELECTRONIC JOURNAL

Learn with People You Can Learn From: Trust, Need for Achievement, and Sharing of Information and Knowledge among Remote Learning Students

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Abstract

In remote learning, students make use of social media and advanced technologies that help with learning, interactions among students, sharing of information, and replication of the face-to-face learning experience as much as possible. How each student experiences remote learning depends on different characteristics that affect different areas of learning. The present study explored how trust and need for achievement might explain information and knowledge sharing among students in remote learning. Three questionnaires were used – addressing trust, need for achievement, and information sharing – to examine levels of these characteristics among students. In addition, students were asked sociodemographic questions. Participants were 444 undergraduate students studying at various academic institutions who answered online questionnaires using a Google Docs file sent to their mobile phone. The findings show positive relationships between trust and sharing knowledge with others and between trust and receiving knowledge from others. In addition, a positive relationship was found between students' level of achievement and sharing knowledge and information with others, but no relationship was found between level of achievement and receiving knowledge and information from others. Hence, the research findings emphasize the importance of building trust in remote learning and its benefits regarding sharing information in remote learning.

Keywords: remote learning, trust, achievement, information and knowledge sharing, students.

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1. Introduction

Starting in 2018, the Higher Education Council (HEC) has promoted digital learning in higher education institutions in Israel, to the extent that 30 % of the courses in each department use this modality. The assumption underlying this decision is that digital teaching can improve the quality of teaching and learning, enhancing the learning experience and pedagogical abilities of the lecturer. The term "digital learning" refers to a learning process in which the construction of knowledge and skills takes place via teaching methods in online spaces using the medium of the internet and digital communication to make higher education accessible and improve and enhance the learning experience (HEC, 2018). The Covid-19 pandemic, which led to a complete lockdown in the state of Israel, accelerated the processes of digital learning, with studies at the academy suddenly transferred to remote (digital) learning. As a result, students were required to adopt remote learning skills, which led to a change in the frequency of information sharing and how students transferred and exchanged information. Sharing knowledge and information among students is related to many characteristics that can directly or indirectly explain the willingness, manner, and level of sharing (Raza et al., 2018).

Online learning has developed in the current era at the same time as technological developments and opened a window to a new type of learning that can replace or complement traditional learning styles. Today, all students and lecturers use these technologies to transmit and share messages, study information, create social relationships, complete assignments and tests, and more. In addition, phrases such as: "Meet on Zoom," "I have a Zoom meeting with the lecturer tomorrow," and "Send me the material on WhatsApp" have become common among students. Along with the technological progress in online learning, students face various problems, difficulties, and barriers that need to be considered, such as technological difficulties, high levels of anxiety, distractions as a result of remote learning, lack of interaction, lack of motivation, and more (Gillis, Krull, 2020). Difficulties of this kind may affect, among other things, how students study, their achievements, and their sharing of knowledge and information.

The theoretical lens on which the present study rests is Nonka and Takeuchi's (1995; 2021) knowledge creation theory for the context of distance learning during the COVID-19 pandemic. Specifically, the present study seeks to examine how the conversion processes between tacit and explicit knowledge sharing are explained in online learning environments where trust and errors play a significant role.

In other words, this study can be positioned as a contributor to an empirical understanding of the roles that trust and achievement motivation play in facilitating or inhibiting knowledge sharing behaviors among students in distance learning contexts. By bridging theories of interpersonal trust, achievement motivation, and bond strength, the study aims to shed light on the factors that enable effective knowledge conversion and transfer when traditional classroom social dynamics are disrupted.

Analyzing these relationships through the lens of Nonaka and Takauchi's (1995; 2021) knowledge creation processes can provide useful insights into the tensions surrounding knowledge socialization and externalization in distributed online learning communities. Positioning it as an empirical extension of this theory to newly emerging remote contexts can be a way to expand the meaning of the study.

Theoretical Background

Remote Learning

With the development of technology in general and the internet, remote learning has become defined as learning through online activity where students have no time and place limitations (Martinez, 2014). In recent years, the development of online technological environments for teaching and learning has accelerated (Hosen et al., 2021; Patel et al., 2013), using different remote learning means that require interpersonal and collaborative communication. Many students use social networks to share information and complete academic tasks. These social networks provide a quick way to communicate among students, and it seems that they have become their preferred way of sharing. Three main types of online learning, also known as remote learning, can be defined: synchronous, asynchronous, and integrated learning.

Synchronous learning is defined as the interaction of participants with an instructor via the internet in real time (Shahabadi, Uplane, 2015). In this environment, there are no physical meetings and tools such as discussions, instant messages, blogs, and more are used. These tools play an important role in personalizing online courses by replicating the classroom experience,

information exchange, and social structure. Synchronized online learning is live, in real time, and usually scheduled. The roots of synchronous online learning are derived from three main influences: the classroom, media, and plenary (participants; Tulaskar, Turunen, 2022). Online learning is not limited in place but only time and is done through classes held in real time through online technology platforms. Moreover, the student does not have the flexibility to decide when to study and must be present at the scheduled class times to complete the learning. Synchronous learning has great advantages related to interacting with other students and the lecturer and asking and responding to questions in real time.

Asynchronous learning, or learning "out of time," requires no commitment for the learners regarding time and place. Students can complete the course requirements without showing up at an educational institution or meeting their classmates and lecturers. The students complete assignments independently by using the educational institution's online learning system, which includes study materials, presentations, videos, and texts. Their schedule is flexible, and learning is based on computer and internet access. The advantages of this study method, among others, are time flexibility, the ability to work at the same time as studying, and the ability to live far from the place of study (Martinez, 2014). The notable disadvantage of this method is that it requires self-discipline, time management, and personal goal setting by the student.

Blended learning is a combination of synchronous and asynchronous teaching and learning components. Usually, most of the learning is asynchronous. Integrated learning environments contribute to higher interactions between students and combine benefits from both types of learning (synchronous and asynchronous; Baber, 2020; Martinez, 2014).

Remote learning has many advantages but also disadvantages. First, a disadvantage relates to interpersonal interaction. Remote learning may lead to social exclusion and perceived damage to traditional classroom teaching methods. Second, online learning can sometimes lead to burnout, lack of interest, and lack of motivation, which are main factors that hinder online learning and cause students to drop out of online courses (Baber, 2020). Third, Gillis and Krull (2020) found that most students who experienced online learning experienced common difficulties and barriers in their online studies, such as technological difficulties, high levels of anxiety, distractions, lack of motivation, and more. These barriers were found mainly, but not only, among students who were non-White, women, or first-generation students.

In the massive and rapid transition to online learning that took place worldwide during the Covid-19 pandemic, most students had to change from traditional face-to-face learning (on campuses) to remote learning (synchronous, asynchronous, or integrated) while using online technology systems. One of the most common and available learning platforms is the Zoom application. This platform is used in virtual conferences, lectures, and online meetings; provides audio, video, and document sharing; and creates an interactive environment, using tools such as small groups and surveys for student feedback recording meetings for future review, etc.

Despite the massive use of Zoom as the most common online learning platform, the means of online learning are diverse and have existed for many years among higher education institutions. Many studies (e.g., Baber, 2020; Maul et al., 2018; Serhan, 2020) examined the issue of online learning and related consequences compared to traditional learning, with the main concern being that remote teaching and learning is not equal in quality to face-to-face learning. Indeed, the results of the studies indicated a lower-quality learning experience. For example, in a study that examined the attitudes and perceptions of students regarding their learning and involvement through online learning via Zoom compared to face-to-face learning, not all students were satisfied with their learning experience during the current transition period and felt that educational institutions must improve and optimize learning practices based on the students' learning needs (Serhan, 2020). In contrast, Maul and colleagues (2018) examined the perceived value of using Zoom among students in doctoral programs and found that both the teaching staff and students indicated that Zoom allowed them to build a quality relationship and increase work efficiency. In addition, a recent study examined the learning outcomes and satisfaction of students from South Korea and India with reference to interaction, motivation, course structure, and how lecturers instruct and guide students, comparing online and traditional learning (Baber, 2020). The study did not find a significant difference in the learning outcomes between online and traditional learning but determined that interactions in online learning and the motivation of the learner are of great importance to students' perceived learning and satisfaction. The study also found that the guidance and knowledge of the lecturers and the structure of the course are important factors

related to the learning results and satisfaction of students. Indeed, lecturers faced a challenging reality that required them to provide students with expertise and technical skills while building a course structure that addressed obstacles in the rapid transition to online learning.

Information and Knowledge Sharing among Remote Learning Students

Information sharing is defined as an idea or process of mutual information sharing leading to the creation of a mix of experiences, values, contextual information, and insights (Raza et al., 2018). When students engage in information and knowledge sharing (IKS), communication channels are created that allow them to share and research, clarify things, and learn together with other students by exchanging information (Raza et al., 2018) – helping with learning and understanding the material and strengthening the relationships among participants. At the same time, information sharing depends on the individual's willingness to share or combine their ideas with others (Farahian et al., 2022; Raza et al., 2018). For example, a study on IKS found that most respondents agreed that sharing knowledge among students would benefit everyone. At least a third of the respondents agreed that information and knowledge should be shared only when approached by other students. Another third disagreed with this position. Nearly half of the respondents said that knowledge sharing should be done voluntarily and that students expect their friends to share important knowledge and information. In a study among students, final situational perceptions such as competitiveness, time pressure, and self-efficacy affected students' IKS behaviors. It also found that students who were under time pressure and feel "too busy" were less likely to share information and knowledge and that high self-efficacy was related to lower perceptions of time pressure and therefore, to sharing more information and knowledge (Connelly et al., 2014).

Social media is a technology that allows users to create and share information, ideas, and thoughts with other people through virtual networks (Baishya, Maheshwari, 2020). As far as the exchange of knowledge and information is concerned, it is possible to distinguish between information sharing carried out remotely versus face-to-face (at work, in studies, in meetings, and more). The means of sharing and transferring knowledge and information remotely include, among others, phone calls, emails, instant messaging apps, Facebook, Instagram, Telegram, Zoom, and a host of advanced social media software and apps that make use of new technologies via a computer, laptop, phone, mobile device, and more. During the coronavirus crisis, when all students switched to online learning, their sharing of information became based mainly on remote information sharing, and one of the main means of remote information sharing is the WhatsApp application.

WhatsApp is an independent application with a focus on building a fast and real-time messaging service around the world. Official data show that the number of WhatsApp users exceeds 2 billion people in more than 180 countries and 60 languages (https://www.whatsapp.com). The application is used to keep in touch with friends and family anytime and anywhere, is provided for free, and offers a simple, safe, and reliable service for transferring information and sending media items such as text, photos, videos, documents, location, and voice and video calls. In a study of student WhatsApp groups (Baishya, Maheshwari, 2020), the researchers found that in addition to academic uses such as sharing information related to classes, study materials, and exams, students use the application for greetings, and entertainment purposes and noted the importance of participating in these groups for social engagement. They also found that when lecturers or teachers are also present in WhatsApp student groups, there is a significant effect on the nature of the group conversation, making them much more formal and limited but with the advantages of direct assistance. Despite this, most students prefer their lecturer not be part of the group. In addition, the study examined why most WhatsApp student groups have some very active students and others who are not as active, finding that students who have information about and are active in classes are most active in the group and share information with the other students. The students' degree of sociability also affects their level of activity in the group. A student who connects easily with everyone tends to be more active in the group, whereas introverted students are less likely respond in the group unless someone mentions their name or addresses them. In fact, the virtual environment is used as a social environment, providing a substitute for interaction and social connection among students. It is possible to develop social and academic relationships that can influence IKS among students.

Nonaka and Takeuchi (2021), in the midst of the Covid-19 pandemic, reexamined their famous theoretical model from 1995, the knowledge-based theory model. The model describes the interactive spiral process of creating new knowledge by converting tacit knowledge into explicit and

vice versa. In their research, they adapted this model to today's new reality known as VUCA (volatile, uncertain, complex, and ambiguous). According to them, the emergence of the internet brought automation that makes data, information, and knowledge (especially explicit knowledge) abundant, open, unlimited, personalized, and shareable. They added to their famous model the concept of practical wisdom, which serves as a driving and directing force of society. Moreover, according to them, in the VUCA world, we need to rely on two areas: the creation of knowledge and strategy, or thinking about the future we want to create.

Importance of Trust among Students in Online Learning

One important characteristic that can explain the correctness of knowledge and information sharing in online learning and society in general is trust, which is defined as a sort of social contract between the giver and receiver (Kravitz, 2011). In general, there are three main types of trust: trust in strangers, people we know, and specific groups of people (Kravitz, 2011). According to Mayer and colleagues (1995), interpersonal trust in others' abilities, benevolence, and integrity increases the desire to give and receive information, resulting in improved performance of distributed groups, which creates and maintains an exchange relationship (p. 228). Another definition of trust refers to trust as a feeling of self-confidence and refuge that creates a caring response among partners and tightens their relationship (Raza et al., 2018).

Moghavvemi et al. (2018) explored the effect of trust and perceived mutual benefit on students' IKS through Facebook and found that trust and mutual benefit are perceived as predictors of information sharing among students. The researchers found that students who know each other and are involved in joint courses will share information and knowledge with each other easily. Also, online communities create an environment that encourages interactions and feelings of belonging and trust; thus, students trust their close friends and feel comfortable asking and answering questions and sharing new information related to the course. The study also showed that when the students know that IKS between them will result in mutual benefit, they are more willing to share knowledge and that a sense of belonging and reduced uncertainty among students will lead to the development of reciprocity and trust. Raza et al. (2018), who studied factors affecting information sharing among students, found that close relationships, trust, and subjective norms mainly affect information sharing, whereas motivation and rewards were found to be related to information sharing to the lowest extent among all factors. Other studies dealing with building trust in online learning environments found that trust is a prerequisite for revealing sensitive information by students, not only in face-to-face situations but also in online environments (Wang, 2014). In addition, trust-building strategies are related to effectiveness and improving student achievement in the online learning environment (Nam, 2014). Researchers also found that the use of video calls in synchronous online studies helps build trust and connection (Castelli, Sarvary, 2021).

In the virtual environment, unlike the traditional (face-to-face) environment, there are difficulties in building trust and sharing information. Alsharo and colleagues (2017) examined the role of information sharing and trust in the effectiveness of virtual teams compared to traditional teams. According to them, IKS affects cooperation, and cooperation affects team effectiveness. Because the assumption is that an effective team integrates and distributes knowledge, the sharing of knowledge depends on the willingness of team members to share; an effective team requires its members to place the success of the organization before their tendency to hoard knowledge. The main cost of sharing information is the loss of the team member's comparative advantage. When the team operates in a virtual space, it cannot observe physical behaviors that establish trust; therefore, a virtual team relies on different behaviors (unique to the virtual space) to assess reliability and compensate for the lack of observable physical behaviors. It is important to note at this point that building trust between virtual team members is a complex process based on cognitive trust because information technologies cannot successfully convey emotions that influence the establishment of trust. These findings are consistent with the concept of "ba" (Nonaka, Takeuchi, 1995). The Japanese word describes the place, space, or framework in which the management of knowledge is carried out in a constant and continuous manner of conversion. The knowledge goes from open to covert and vice versa. To process and manage it, hidden knowledge must become visible knowledge and personal knowledge must become shared and organizational knowledge. Therefore, among students in the current context, where "ba" is the virtual space in which they study, the conditions of the space must be known to find characteristics that can optimize their success in their studies and lead to maximum information sharing.

Cooperation is important to build trust, which will lead to success in the learning processes and increase IKS among students in remote learning.

Strength of Relationships among Students in Online Learning

The literature distinguishes between two main types of ties: weak and strong ties, as presented by Granovetter (1973), and redundant ties and nonredundant ties, as presented by Burt (1992). Relationship strength is defined as "a combination of the amount of time, emotional intensity, intimacy and intimacy and mutual services that characterize the relationship" (Granovetter, 1973: 1361). Hence, the strength of ties usually ranges from strong to weak, based on the closeness of the relationship and frequency of interaction (Evans et al., 2019; Granovetter, 1973; Hansen, 1999).

The research and theoretical literature present a complex picture of the relationship between the strength of ties and the willingness to share and transfer knowledge and information between individuals. For example, Constant et al. (1996) argued that in most cases, individuals use the weak ties they have accumulated to search for information that is not available among friends and coworkers. In other words, although the tendency is to use strong ties, which are created in part because of the physical proximity of two or more actors, when information is not available from these ties, people will tend to use weaker ties. This is because weak ties are preferred over strong ties for two main reasons: First, weak ties contain a greater number of potential helpers when some problem arises. Second, more advice can be received due to having more weak ties, because the wider the range of ties, the higher the chance of receiving an effective response (Constant et al., 1996). However, when there is a transfer of knowledge between employees from different organizations, through internet networks, a certain problem may arise. The information often comes from foreign sources who are sometimes geographically distant and the information depends mainly on their niceness – kindness and good will (Constant et al., 1996). In addition, the motivation of strangers to help other people may be weak and sometimes nonexistent. On the other hand, other studies have shown that it is precisely strong ties that explain the willingness to share knowledge and information. The argument is that when strong ties exist, there is also an established familiarity based on frequent interactions (Hansen, 1999). Therefore, the members of that strong social network develop shared expectations and conclusions related to common codes, language, and narratives (Uzzi, 1999) that contribute greatly to learning (Reagans, McEvily, 2003), innovation (Obstfeldt, 2005), and the ability and capabilities of transferring and sharing knowledge because this transfer is carried out in small and smooth steps. However, the network members are aware of the knowledge held by other network members and in this sense, they trade information that the searcher already knows about (d, p. 1478). Therefore, a dense network is inefficient, in that it returns less diverse information at the same cost as a sparse network (Nahapiet, Ghoshal, 1998).

Need for Achievement as a Factor Explaining IKS

The need for achievement, also called achievement motivation, also explains IKS among students. The need for achievement is a kind of drive that helps people reach their goals with distinction and is defined as the desire and effort to increase or maintain personal abilities as much as possible in all activities where standards of excellence apply (Heckhausen, 1967) and aspiration for success exist (Atkinson, 1966). In this context, motivations for achievement include automatic motivations and awareness that accumulate over the life course (Conroy, 2017; Turner et al., 2021). People with a high need for achievement have a strong desire to be at a more advanced level than their peers. They do not like to succeed by chance and prefer that their personal character led to their success.

Self-determination theory, developed by psychologists Richard Ryan and Edward Deci (see Deci, Ryan, 2000), provides an important and interesting explanation for the need for achievement. The theory deals with motivation to act based on a person's natural tendencies and needs. According to this theory, three motivational factors motivate a person to act: self-motivation, external motivation, and motivation arising from self-criticism. Self-motivation is motivation that comes from a person to do a certain action because they are interested in acting, choose to act, and want to act. Extrinsic motivation is a motivation for engaging in a certain activity resulting from an external goal such as a reward for the action or avoidance of punishment. Last is motivation arising from self-criticism such as avoiding feelings of guilt or shame. According to this theory, students' need for achievement and motivation to address this need can stem from self-motivation factors (innate need for excellence, satisfaction from success, etc.), external motivation factors (high

grades as a form of return or reward), or motivation arising from self-criticism (fear of disappointing others or failing).

The need for achievement is often associated with competitiveness. Researchers have identified a relationship between self-esteem and competitiveness and that high levels of self-esteem and competitiveness can (but do not necessarily) increase a person's achievement levels in all aspects of life (Janssen, Askari, 2019). The researchers tried to define the difference between competitiveness and need for achievement, citing previous studies that indicated that competitiveness is related in a certain aspect of the need for achievement. In fact, the motivation for achievement often involves competition with some standard of excellence that may be related to the task, self, or others (Smither, Houston 1992; Janssen, Askari, 2019). Furthermore, a connection exist between competitiveness and the desire to share knowledge, which is explained by the fact that among competitive people, competition for royalties may cause a reduction in IKS because it involves effort and causes the competitive person to move away from the task they are supposed to perform. That is, competitive people may perceive IKS as harming their performance. Therefore, people who try to be better than others and maximize performance (because of their high need for achievement and competitiveness) often avoid sharing knowledge with others with whom they compete (Bartol, Srivastava 2002; Connelly et al., 2014). Therefore, in the context of the current study, competitive students with a need for high achievement might be less willing to share academic knowledge with other students to maintain an advantage and be more successful. However, in the context of remote learning, these competitive dynamics may be intensified. As noted earlier, remote learning creates difficulties in building trust and social connections, mainly due to lack of face-to-face interaction (Alsharo et al., 2017). Unlike traditional classroom settings where social norms and collaborative behaviors are more visible and reinforced, remote learning environments emphasize individual performance and self-directed learning (Baber, 2020; Gillis, Krull, 2020). Furthermore, the asynchronous nature of much remote learning means that knowledge sharing requires additional intentional effort (Martinez, 2014). Students with high achievement motivation, who seek to maintain academic advantage and outperform their peers (Connelly et al., 2014), may be particularly reluctant to invest this extra effort when they perceive knowledge sharing as potentially diminishing their competitive edge in the less socially regulated remote environment. Therefore, we expect that in remote learning contexts, the negative relationship between achievement motivation and knowledge sharing will be more pronounced

This review of the literature indicates the multitude of existing studies on sharing, trust, achievement, and online learning among students and in general. Trust can affect the level of IKS. Trust is an important element that is built while getting to know others, understanding verbal and nonverbal cues, developing a sense of belonging and familiarity, engaging in social interactions, and more, and it seems that trust between people encourages IKS. However, remote learning creates difficulties in building trust, mainly due to the lack of interaction among students (Alsharo et al., 2017). Therefore, it is important to examine the strength of relationships, trust, and information sharing in remote learning.

The current study also focused on the need for achievement. This appear to depend on different motivations of each person and is subjective (Deci, Ryan, 2000). The research literature on the need for achievement and its relationship with information sharing is scarce. Achievement motives such as competitiveness, self-motivation, and drive for excellence were found to be indirectly related to the need for achievement and capable of influencing information sharing (Connelly et al., 2014). In remote learning, creating interactions between students is significant for sharing knowledge and helps them during their studies (Baishya, Maheshwari, 2020; Heusler et al., 2019). It is possible that for a student with a high need for achievement, interacting with fellow students and building trust and sharing information will be perceived as less important or necessary because they will tend to keep academic knowledge to themself and thus, reap high achievements and be more successful than their fellow students. To the best of our knowledge, attempts to combine all these factors in one coherent study are absent from the research and theoretical literature. Information sharing is an essential element in any organization that creates new knowledge and strengthens the organization. For students, the sharing of information is extremely important to learning outcomes and friendship processes (Lam, Ford, 2010; Raza et al., 2018). In online learning, IKS is mainly done with modern technological means that try to overcome the limitations of distance and represent a new challenge for both students and the

teaching staff. Therefore, this study explored how remote learning affects IKS students regarding trust and need for achievement. We derived the following hypotheses:

1. A positive relationship exists between the level of trust among students and level of IKS (receiving and giving). Hence, the higher the level of trust, the higher the level of IKS.

2. A negative relationship exists between students' level of achievement and level of IKS with their friends (receiving and giving). Hence, the higher the level of achievement, the lower the level of IKS.

3. Receiving knowledge and information from others makes a significant unique contribution to the strength of ties, trust, and success among students, with the highest unique contribution coming from the strength of ties.

4. Giving knowledge and information to others makes a clear unique contribution to the strength of ties, trust, and success among students, with the highest unique contribution coming from the strength of the ties.

2. Method
Sample

This study featured 444 undergraduate students studying in various academic institutions in Israel in fully online courses. The data in Table 1 show that 78.8 % were female students (*n* = 350) and 21.2 % were male students (*n* = 94). Their average age was 27.12 years (*SD* = 7.36). Regarding marital status, 73 % of the students were single. As for religion, 84.7 % of the students were Jewish, 8.8 % were Muslim, 2.7 % were Christian, and the rest were Druze or not religious.

Table 1. Students' Preferred Form of Study and Frequency of Information Sharing (N = 444)

Variable	*n*	%
Preferred form of study	**444**	
Face-to-face learning	206	46.4
Synchronous online learning only	71	16.0
Integrated online learning (synchronous, asynchronous)	1	0.2
Face-to-face learning in college combined with online learning	151	34.0
Frequency of sharing information with friends	**444**	
Never	26	5.90
Once every 2 or 3 weeks	49	11.0
Once a week	100	22.5
Every day	163	36.7
Several times a day	106	23.9

The questionnaire was sent to students from institutions recognized by HEC. Students from 21 academic institutions answered the questionnaires; 148 (33.3 %) were in their first year of studies, 133 (30.0 %) were in their second year, 125 (28.2 %) were in their third year, and the rest were in prep school or fourth year or higher (6.7 %).

Table 1 shows that the preferred form of studying for these students was face-to-face learning (46.6 %), whereas online learning was in last place by a significant margin (0.2 %). Most students shared information with each other, with a frequency ranging from once a day to several times a day (36.7 % and 23.9 %, respectively).

The extent to which the students used technological aids to share information with each other in remote learning were rated on a scale of 1 (*never*) to 5 (*several times a day*). Students seemed to prefer sharing knowledge through WhatsApp. It also appears that the students were more inclined to share knowledge (*M* = 5.20, *SD* = 6.73) than to receive knowledge from others (*M* = 3.53, *SD* = 3.78). It also appears that the number of friends to whom they provided help was relatively large and there was great variation in the number of students with whom they shared knowledge and information. However, there was relative heterogeneity in the number of people from whom they tended to receive information (see Table 2).

Table 2. Students' Average Use of Technological Aids to Share Information during Remote Learning[1]

	M	*SD*
Technology		
Desktop Computer	3.62	1.13
Laptop	4.02	0.99
Email	3.19	1.37
WhatsApp	4.72	0.68
Facebook	1.53	0.91
Zoom	3.06	1.36
Phone call	2.63	1.32
General average for IKS (receiving)	3.62	1.13
Average number of friends helped	5.20	6.73
Average number of friends asked for help	3.53	3.78

Measurement
Knowledge and Information Sharing

IKS among students was assessed using a sociometric questionnaire (Mesch, Talmud, 2006) adapted to test relationships between teenagers in a joint activity and updated by Shamir (2006). The questionnaire is designed to assess, among other things, joint activity, main topics of conversation, helping other students, and receiving help from other students.

Types of Joint Activities (Strength of Ties)

This index includes seven joint activities in which students usually engage. The index scores range from 1 (*often*) to 5 (*never*). An example item is "to exchange material for chores and work." The internal consistency obtained for this measure was $\alpha = .78$.

IKS to Others

This measure tests the sharing of educational information from the focal student to other students. The index included five items with response options ranging from 1 (*often*) to 5 (*never*) and one open-ended question. An example item is "helping your friends prepare for tests and exams." The internal consistency obtained for this measure was $\alpha = .89$.

IKS from Others

This index tests educational information that the focal student received from other students. The index included five items with scores ranging from 1 (*often*) to 5 (*never*) and one open-ended question. An example item is "taking pictures of lesson summaries agreed by your friends." The internal consistency obtained for this measure was $\alpha = .88$.

This instrument was originally developed in Hebrew for Hebrew-speaking populations and was administered to Hebrew-speaking students in the current study. The questionnaire demonstrated adequate validity and reliability in previous research (Shamir, 2006)

Trust

The level of trust between students was assessed using the Interpersonal Trust at Work questionnaire (Cook, Wall, 1980), which was translated into Hebrew by Heller (2016). The original questionnaire contains 12 items, but this study used only five items because the other items measure employees' trust in management. The students expressed their agreement with the items on a 7-point Likert scale, ranging from 1 (*do not agree at all*) to 7 (*completely agree*). A sample item is "If I run into difficulties in my studies, I know that my fellow students will try to help me." The internal reliability obtained for this measure was $\alpha = .92$.

Achievement

This variable was assessed using the Need for Achievement questionnaire (Elliot, 1999; Elliot, McGregor, 2001). The questionnaire was translated by Sheaf (2009) with the assistance of bilingual experts using the repeated translation method. The questionnaire measures the need for achievement, control, and execution with reference to avoidance (fear of failure) and approach (need for achievement and success). The questionnaire has 12 items on a scale from 1 (*not at all true for me*) to 7 (*very true for me*). An example item is "My goal is to get a better grade than most of the other students." The internal consistency obtained for this measure was $\alpha = .80$.

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[1] Measurement scale: 1–5.

Research Process

The interviewees were recruited using nonprobability snowball convenience sampling. The questionnaires were sent to the students using a Google Docs file to their mobile phone via WhatsApp. In addition, the questionnaire was distributed on Facebook in various student groups. According to research ethics, at the beginning of the online questionnaire, a mandatory question was provided and all respondents were required to answer: "I express my informed consent to participate in the research and am aware of my right to leave at any time without explaining." The study received the approval of the Ethics Committee of Emek Yezreel Academic College (2021–37).

3. Results

First, descriptive findings are presented, providing a picture of the students' attitudes regarding the research variables. The data (Table 3) show that the students tended to provide information moderately frequently ($M = 3.53$, $SD = 1.04$[1]), but they received knowledge less frequently ($M = 2.97$, $SD = 1.03$). The data also show moderate trust relationships[2] between the students ($M = 4.72$, $SD = 1.46$), but they did not often take part in various joint activities ($M = 2.74$, $SD = 0.78$). Finally, the students reported that they have a high level of achievement[3] ($M = 5.28$, $SD = 0.91$).

Table 3. Descriptive Statistics for Information Sharing, Trust, and Need for Achievement (N = 444)

Variable	M	SD
Gives information	3.53	1.0
Receives information	2.97	1.03
Trust level	4.72	1.46
Strength of ties (joint activities)	2.74	0.78
Achievement level	5.28	0.91

IKS, Trust, and Achievement

To test statistical relationships, Pearson correlations were calculated between trust, need for achievement, and IKS (receiving and giving). The findings show a positive relationship between receiving knowledge and information from others and sharing knowledge and information with others ($r = .572$, $p < .001$; Table 4). There was also a positive relationship between trust and sharing knowledge with others (giving; $r = .345$, $p < .001$). According to Cohen's (1988) guidelines for interpreting correlation coefficients, the relationship between receiving and giving knowledge ($r = .572$) represents a large effect size, while the relationship between trust and giving knowledge ($r = .345$) represents a medium effect size. Finally, a positive relationship was found between sharing knowledge with others (giving) and the student's level of achievement ($r = .101$, $p < .05$), but no significant relationship was found between the level of achievement and receiving knowledge from others ($p > .05$). These findings provide support for Hypothesis 1, indicating a positive relationship between trust and IKS. However, Hypothesis 2 was only partially supported: while a positive (rather than negative) relationship was found between achievement level and giving knowledge ($r = .101$, $p < .05$), no significant relationship was found between achievement level and receiving knowledge.

Table 4. Relationships between IKS, Trust, and Need for Achievement (N = 444)

Variable	1	2	3	4
1. IKS (receiving)				
2. IKS (giving)	.572**			

[1] Measurement scale: 1–5.
[2] Measurement scale: 1–7.
[3] Measurement scale: 1–7.

Variable	1	2	3	4
3. Trust	.416**	.345**		
4. Strength of ties	.543**	.524**	.429**	
5. Achievement	.057	.101*	.150	.102*

Notes: *p < .05. **p < .001.

The regression findings, which are presented in Table 5, show a significant regression result, $F(3,443) = 61.222$, $p < .001$), with a multiple correlation of .54 and explained variance of .29. This R^2 value of .29 indicates that trust and strength of ties together explain approximately 29 % of the variance in receiving knowledge and information, representing a medium to large effect size (Cohen, 1988). The standardized regression values indicate trust and strength of ties significantly contributed to predicting the receipt of knowledge and information. The strength of ties had the strongest effect on the tendency to receive knowledge and information. Therefore, the hypothesis was confirmed, indicating that receiving knowledge and information from others is significantly predicted by strength of ties and trust, with strength of ties making the strongest unique contribution ($\beta = .454$, p < .001).

Table 5. Regression Analysis of Research Variables that Predict Receiving Knowledge and Information from Others (N = 444)

Variable	b	SE	β
Trust	0.106	0.310	.149*
Achievement	0.059	0.460	.052
The strength of ties	0.603	0.590	.454**
R	.543		
R^2	.294		
ΔF	61.222**		

Notes: *p < .01. **p < .001.

The regression findings, which are presented in Table 6, show a significant regression result, $F(3,443) = 74.141$, $p < .001$), with a multiple correlation of .58 and explained variance of .33. This R^2 value of .33 indicates that the model explains approximately 33 % of the variance in giving knowledge and information, representing a large effect size (Cohen, 1988). The standardized regression values indicate that the contribution of trust and strength of ties to the prediction of receiving knowledge and information from others is significant. The strength of ties had the strongest effect on the tendency to transfer knowledge and information.

Table 6. Regression Analysis of Research Variables Predicting Transfer of Knowledge and Information from Others (N = 444)

Variable	b	SE	β
Trust	0.160	0.310	.225*
Achievement	0.009	0.044	.008
The strength of ties	0.591	0.057	.445**
R	.579		
R^2	.336		
ΔF	74.141**		

Notes: *p < .01. **p < .001.

Therefore, the hypothesis was confirmed, indicating that giving knowledge and information to others is significantly predicted by strength of ties and trust, with strength of ties making the strongest unique contribution ($\beta = .445$, p < .001).

4. Discussion
Sharing of knowledge among students is immeasurably important and depends on many characteristics. In light of HEC (2018) requirements for online courses to accont for 30 % of courses in each department, students are required to adopt remote learning skills. Remote learning students

may experience difficulties and barriers that depend on many characteristics that explain their willingness to share knowledge. Therefore, the present study focused on the strength of ties, trust, and need for achievement as possible factors that could explain IKS among remote learning students.

Similar to the findings of previous studies (Moghavvemi et al., 2018; Raza, 2018; Wang, 2014), the first hypothesis regarding the relationship between the level of trust and degree of IKS among students (receiving and giving) was confirmed. That is, positive relationships were found between trust and giving knowledge to others and between trust and receiving knowledge from others. Trust is built step by step at different rates, depending on the type and nature of the relationship between people, and is influenced by attitudes and ways of acting. When trust between people matures, the ground is ready for learning and working together. The findings of the current study are consistent with the findings of Mayer and colleagues (1995), who showed that knowledge sharing is based on trust, which is perceived as a characteristic that increases the desire to give and receive knowledge and information, and as a result, creates and maintains exchange relationships. This finding is particularly significant in the context of remote learning, where trust-building processes face unique challenges. According to Nonaka and Takeuchi's (1995) knowledge creation theory, the virtual learning environment serves as the 'ba' — the shared space where knowledge conversion occurs. In remote learning contexts, trust becomes even more critical because students must rely on cognitive trust rather than affective trust that develops through physical presence and face-to-face interaction (Alsharo et al., 2017). The current findings suggest that despite these challenges, students were able to develop sufficient trust through digital means to facilitate knowledge sharing, supporting the notion that technological platforms can serve as effective 'ba' for knowledge creation when trust is established.

In addition, this finding is consistent with a previous study that showed that despite the transition to remote learning and difficulties in building trust at a distance, students managed to build trust in their friends and share knowledge and information using technological means (such as social networks and instant messaging programs), which are a kind of substitute for face-to-face socializing processes (Alsharo et al., 2017).

The second hypothesis, which tested a negative relationship between achievement level and knowledge and information sharing (receiving and giving), was partially confirmed. That is, a positive relationship was found between the student's level of achievement and IKS (giving), but no relationship was found between the level of achievement and receiving knowledge and information from others. This finding has been reinforced in studies that also found no connection between the desire to achieve a better result than others and willingness to share knowledge and information (Lam, Lambermont-Ford, 2010; Connelly et al., 2014; Raza et al., 2018). It is possible that a student characterized by high levels of achievement also has high self-esteem and therefore, will not usually feel threatened to share knowledge and information with friends. Also, they will feel self-confident enough in their achievements and knowledge and will not perceive sharing knowledge and information with others as a threat to their academic success. This finding suggests that in remote learning environments, where the emphasis on individual performance is more pronounced (Baber, 2020; Gillis, Krull, 2020), students with high achievement motivation do not fear sharing knowledge with others. This may indicate that in the virtual space, where knowledge sharing requires intentional effort (Martinez, 2014), students with high academic self-confidence perceive knowledge sharing as an opportunity to strengthen their social and academic standing within the student network, rather than as a threat to their advantage. This finding aligns with the conception of knowledge as a social force that is strengthened through sharing rather than hoarding (Nonaka, Takeuchi, 1995).

Furthermore, they will not be asked for and therefore, knowledge and information will be received easily (Ghaziri, Awad, 2015; Ismail, Yusof, 2010). Therefore, it can be assumed that the lack of connection between level of achievement and receiving knowledge from others lies in the fact that a student with a high need for achievement wants to maintain an academic advantage and higher achievement than others and will carefully clarify the source and nature of the knowledge they receive from others.

5. Conclusion
Finally, the third and fourth hypotheses posited a distinct unique contribution to the strength of the ties between students in relation to IKS (receiving and giving); these hypotheses were confirmed. These findings are consistent with previous studies (Hansen, 1999; Obstfeldt, 2005;

Uzzi, 1999) that found that strong ties explained willingness to share knowledge and information. Based on these studies, frequent interactions help create strong bonds. Hence, students who study in the same department and the same course might create a strong social network in which codes of conduct, language, and shared norms develop throughout their studies, helping them learn what information and knowledge is allowed or acceptable to ask for or receive and from whom it can be requested or received (Uzzi, 1999). Moreover, because IKS occurs in small steps (Obstfeldt, 2005), throughout the learning process (that is, a semester or degree program), the process of IKS and the norms of behavior expected from members of the network are gradually established. Because IKS is carried out in parts, each time a small part of the learned material is shared. This situation allows both parties to examine the scope of the sharing and also the quality of the knowledge and information that passes through the network. As sharing processes with higher frequency and quality, they contribute to the tightening of relations among members of the network, increase the level of trust, and contribute to the strengthening of ties. These findings are particularly meaningful in the remote learning context, where the development of strong ties faces significant challenges due to lack of physical proximity and reduced opportunities for spontaneous interaction (Alsharo et al., 2017). The strong contribution of tie strength to IKS suggests that even in virtual environments, students who invest in building relationships through repeated interactions create the shared codes, language, and norms necessary for effective knowledge transfer (Uzzi, 1999). This supports Nonaka and Takeuchi's (1995) concept of socialization in knowledge creation – the conversion of tacit knowledge through shared experiences. In remote learning, this socialization process occurs through digital platforms, but the underlying mechanism of relationship building through repeated, quality interactions remains critical for knowledge sharing

Study Limitations and Recommendations for Future Studies

First and foremost, this study used nonprobability convenience and snowball sampling through social media platforms. This sampling method limits the generalizability of the findings to the broader student population. The sample may be biased toward students who are more digitally active, more socially connected, or have specific characteristics that led to their inclusion in the study through referral networks. Therefore, caution must be exercised when attempting to generalize these findings beyond the specific sample studied, and the results should be interpreted as exploratory rather than definitive.

Despite the uniqueness of the current study, one limitation is the minority of men in social science circles in general and hence, also in the current study. It is possible that in programs characterized by a higher percentage of men (engineering, economics, computers, etc.), they discover other patterns of IKS. Therefore, researchers should carry out research in a wide variety of fields with a wider representation of men, which will make it possible to make comparisons and examine differences between women and men regarding the research hypotheses. Second, the data were collected through self-report questionnaires, so the research findings may suffer from social bias. Researchers should use qualitative methods such as in-depth interviews that can provide a deeper understanding of the subject. Third, the study was conducted at a certain point in time, so no conclusions can be drawn regarding changes over time. Longitudinal studies can provide more robust data on how these relationships change over time. Finally, in addition, we could not obtain data regarding what knowledge they shared and their degree of success in the course.

Research Contributions and Implications

The field of online learning is still developing, and these findings suggest that it may be important to build educational and social support programs for students that will help them in this complex situation and continue their studies. According to the current study, most students still prefer face-to-face learning. Students who had to switch to remote learning faced quite a few difficulties and challenges. Nonetheless, it seems that remote learning is quite a worthy competitor and with giant strides, has managed to overcome the gaps to face-to-face learning. The current study contributes to our understanding of the importance of the interaction between remote learning students, as noted repeatedly in the literature review, and emphasizes the need for connections between students to build a social infrastructure that will help them collaborate. Furthermore, within the context of this sample, the research findings suggest the importance of building trust in remote learning and its potential contribution to IKS in remote learning. However, given the study's methodological limitations, these findings should be interpreted cautiously and require further validation with more representative samples.

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