

Evaluation of Chat and Video Conferencing Systems for Student Social Interaction During the Covid-19 Pandemic

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Motivation for Research



- Student social interactions are an important part of their Higher Education (HE) experience
- With the pandemic, socialising became difficult because of social-distancing restrictions and lockdown
- Socialising moved online via ICTs (internet communication technologies) such as:
 - Chat systems (e.g. Whatsapp, Messenger)
 - Video conferencing (VC) Systems (e.g. Zoom, Microsoft Teams)

Aim of the study and Research Questions

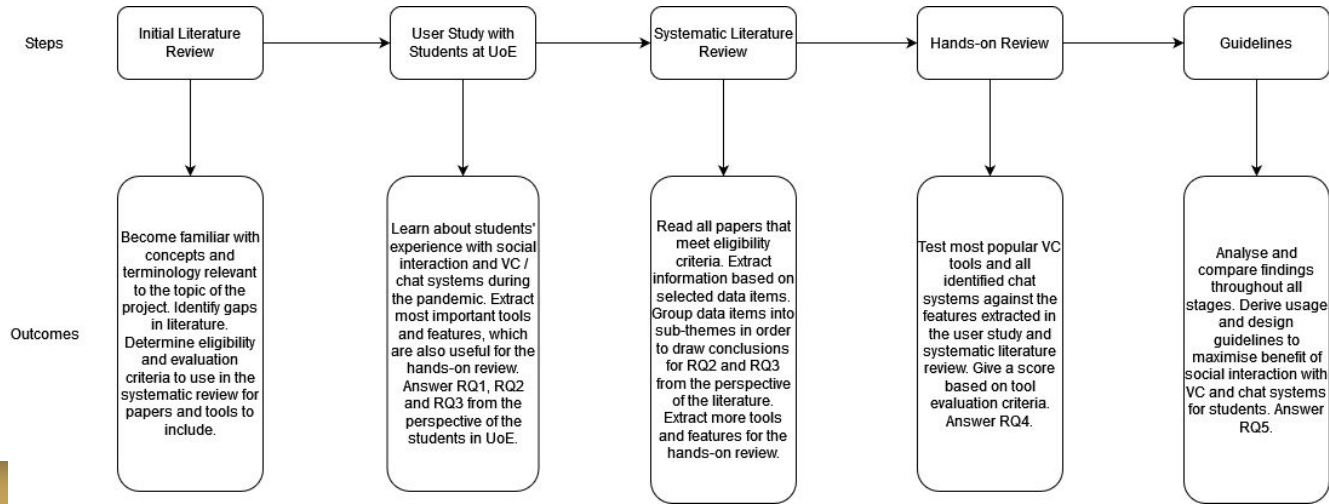
- RQ1: Characteristics of a beneficial online social interaction
- RQ2: Ways students made use of chat/VC systems for social interaction
- RQ3: Chat and VC system comparison
- RQ4: Which features of Chat/VC were most or least helpful?
- RQ5: Guidelines derived for design practices to better facilitate beneficial social interaction between students via chat/VC systems



Methodology



1. Background research on the topic and literature review
2. User study in the form of questionnaire
3. Systematic review of literature on student experience, using the PRISMA statement
4. Reviewing chat and VC systems to evaluate their effectiveness overall and based on individual features
5. Deriving guidelines based on results from previous steps



User study



Materials:

- Participant Information Sheet
- Consent Form

Data Collection Process: Questionnaire

Participant Recruitment:

- Email to All Informatics Students
- Message to Online Student Groups
- Direct Messages

Data Analysis Methods:

- Quantitative: Descriptive Statistics, Observation of Diagrams/Graphs
- Qualitative: Thematic Analysis

Systematic Review

- Planning the review:
 - Eligibility Criteria
 - Keywords
 - Search Strategy
 - Data Collection Process
- Conducting the review:
 - Study Selection
 - Results
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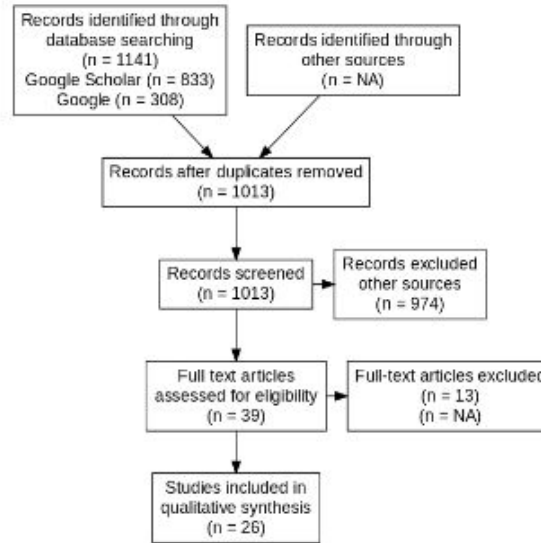


Figure 5.1: PRISMA Flow of studies for systematic review



Chat system evaluation



A	B	C	D	E	F	G	H	I	J	K	L	M	N
Chat system name	URL	Notes/Issues	In English	Freely available	Fully Functional	Available to download	Updated within last 2 years	Primary function is messaging	Private messaging	Group messaging	File-sharing	Sharing images and videos	Chat/Message History
1. Whatsapp	https://www.whatsapp.com/		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2. Facebook Messenger	https://www.messenger.com/		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3. Telegram	https://telegram.org/		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4. Google Chat (formerly Hangouts)	https://support.google.com/chat/answer/7653601?hl=en-GB&co=GENIE.Platform%3DAndroid	Google Hangouts was discontinued in November 2022, the new version of the app is Google Chat	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5. Snapchat	https://www.snapchat.com/		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
6. Wechat	https://www.wechat.com/		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
7. Viber	https://www.viber.com/en/		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
8. Kik Messenger	https://kik.com/		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
9. KakaoTalk	https://www.kakaocorp.com/page/service/service/kakaoTalk?lang=en		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
10. Line	https://line.me/en/		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
11. Discord	https://discord.com/		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
12. Slack	https://slack.com/intl/en-gb/features		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
13. Skype	https://www.skype.com/en/		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
14. Groupme	https://groupme.com/en-US/		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
15. Signal	https://signal.org/		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
16. iMessage	https://support.apple.com/messages	*Required Apple Device	Y	n*	n*	n*	Y	Y	Y	Y	Y	Y	Y
18. Tencent QQ	https://im.qq.com/		n	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
17. BBM	https://www.blackberry.com/us/en/products/bbm-enterprise-bbme	Unable to sign up for account without asking to pay Unable to access download page,	Y	n	Y	Y	Y	Y	Y	Y	Y	Y	Y
19. eBuddy XMS	https://www.ebuddyxms.com/	no mobile version found	Y	Y	n	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20. Differ	https://thehub.io/startups/differ	Unable to make account app crashed multiple times	Y	Y	n	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

A	B	C	D	E	F	G	
1	Chat System Names:						
2							
3				Whatsapp	Skype	Telegram	
4	Chat System Features:						
5		Account	Phone number required		1	0	1
6			Email required		0	1	0
7					1	1	1
8		Account and User Profile	Picture		1	1	1
9			Bio/caption/status feature		1	1	1
10			Share Story		1	0	0
11			Username		1	1	1
12			Profile	Feature exists		1	1
13		Option to change/disable presence visibility			1	1	1
14						6	5
15					7	6	6

VC System Evaluation



	Video (out of 4)	Screen sharing (out of 7)	Chat (out of 5)	Noise Reduction (out of 4)	Active Talk Indicator (out of 4)	Breakout Rooms (out of 8)	Shared Whiteboard (out of 6)	User friendly UI (out of 10)	Total (out of 48)
Zoom	4	6	5	4	0	4.5	3	8.5	35
Webex	2.5	5.5	2.5	3	2	5	2.5	9	32
Tencent Meeting (VooV)	3.5	6	4	1.5	2	6	0	7	30
Google Meet	2.5	4.5	1.5	3	4	0	5.5	8.5	29.5
BlueJeans	2	5	3.5	2.5	1	6	1.5	8	29.5
Gather	1	5	3	0	2.5	7	0	7	25.5
Jitsi Meet	1	5	3.5	0.5	3.5	0	6	6	25.5
Free Conference	1.5	5	2.5	0	2	3	3.5	7.5	25
Facebook Messenger	2.5	5.5	5	2	0	0	0	9.5	24.5
Skype	4	4.5	5	3	3	0	0	4.5	24
Discord	2	5	4.5	2	0	0	3	6	22.5
Slack	2	5.5	5	1.5	1	0	0	7	22
Microsoft Teams (for work or school)	1.5	6	4	4	0	0	0	6.5	22
Microsoft Teams	1.5	3	5	3	0	0	0	8.5	21
GoTo Meeting	2	5.5	3	0	2.5	0	0	7	20
Signal	1	2.5	4.5	0	3.5	0	0	6	17.5
Whatsapp	1.5	0	5	3	0	0	0	6.5	16
Telegram	1	4	4	0	0	0	0	6.5	15.5
Mean	2.06	4.64	3.92	1.76	1.5	1.75	1.39	7.19	24.3
Median	2	5	4	2	1.5	0	0	7	24.3
Mode	1,1.5,2	5	5	0	0	0	0	7	29.5, 22, 25.5
Standard Deviation	0.941	1.46	1.04	1.42	1.40	2.58	1.97	1.24	5.27

Name of System	Type of System	Was it Tested	Reason if not
Facebook Messenger	Instant Messaging (IM) app with VC functionality	Yes	
Whatsapp	IM app with VC functionality	Yes	
Zoom	Dedicated VC app	Yes	
Microsoft Teams	Collaboration tool with VC functionality	Yes	
Microsoft Teams for Work or School	Collaboration tool with VC functionality (specific to organizations)	Yes	
Google Hangouts	Online collaboration tool with VC functionality	No	Implements Google Meet for VC functionality (see below)
FaceTime	Dedicated VC app	No	Not available on Windows
Skype	Dedicated VC app	Yes	
Skype for Business	Dedicated VC app (specific to organizations)	No	Need an organizational email with access to an account
Slack	Collaboration tool with VC functionality	Yes	
FreeConference	Dedicated VC app	Yes	
GoTo Meeting	Dedicated VC app	Yes	
Discord	Collaboration tool with VC functionality	Yes	
Tencent Meeting (VooV)	Dedicated VC app	Yes	
Google Meet	Online dedicated VC app	Yes	
Jitsi Meet	Online dedicated VC app	Yes	
Signal	IM app with VC functionality	Yes	
BlueJeans	Dedicated VC app	Yes	
Telegram	IM app with VC functionality	Yes	
Google Duo	Online dedicated one-on-one VC app	No	No longer exists – has been merged into Google Meet
Line	IM app with VC functionality	No	Technical difficulties
WeChat	IM / social media app with VC functionality	No	New users must be verified by an existing user
HouseParty	Dedicated VC app	No	No longer exists
Gather	VC app / collaboration tool	Yes	
Webex	Dedicated VC app	Yes	
Adobe Connect	Webinar app	No	Did not fall under the definition of VC systems

Results



RQ1: What makes a beneficial online social interaction?

- Similar to face-to-face interaction -> relevant to context of pandemic
 - Emotional connection / closeness / support
 - High video and audio quality to simulate eye contact, non-verbal cues, facial expressions.
- Different from face-to-face interaction -> general case
 - Offer capabilities that are not present in face-to-face
 - Convenient
 - Useful / productive / Fruitful
- Emotions and Relationships
 - Desire for community/sense of belonging and conversely wanting to avoid feelings of loneliness and isolation
 - Importance of relationships with students, friends and family

RQ2: In what ways did students make use of chat systems?

Extracurricular Context:

- Maintain pre-existing relationships
- Form new connections
- Casual conversation
- Arranging meeting-up (online or in-person)

Academic Context:

- Questions about homework or exchanging academic advice.
- Collaborative learning/Group work
- Informal language practice

RQ2: In what ways did students make use of VC systems?

Extracurricular Context:

- Online gaming
- Watching movies together
- Studying together
- Simulating co-presence

Academic Context:

- Ice breakers organised by lecturers
- Opportunity for socialisation in breakout rooms
- Group or private messaging during lectures

RQ3 Chat/VC System overall comparison

- Whatsapp identified as the top chat system overall
- Other chat systems identified as highly effective: Facebook Messenger, Snapchat, Discord, Skype and Telegram
- Kik Messenger ranked the lowest in the evaluation
- Top 3 VC Tools were: Zoom, Webex, Tencent Meeting (VooV)
- Telegram ranked the lowest
- Honourable Mentions: Gather, Facebook Messenger, Google Meet
- Dedicated VC tools ranked higher on average than other online tools that simply included a VC functionality

RQ4: Which features of Chat were most or least helpful?

Helpful features:

- Graphics (especially emojis and GIFs), Voice notes/messages, message reactions, sharing media files, calls, group chats
- Ease-of-use, accessibility and security

Less helpful features:

- Text-based messaging, Read Receipts, Location sharing, Online status, notifications, reliance on internet connectivity

RQ4: Which features of VC were most or least helpful?

Students had the most positive experience with VC tools out of all other means of online interaction

Overall experience was still negative because VC tools are still lacking compared to face-to-face interaction

- **Helpful features:** video, screen sharing, group chat, user friendly UI, active talk indicator, shared whiteboard, compatibility with many OSs / devices
- **Unhelpful features:** filters, embedded AR games, switching devices mid-call, screen interactivity
- **Features that would be helpful if improved:** breakout rooms, noise reduction

RQ5: Guidelines and Recommendations: Chat Systems

Add and improve features to facilitate:

1. **Multimodality:** Utilising different forms of communication, not just text
2. **Customisation:** Make communication more personal and interactive
3. **Group Communication:** Including features such as message reactions, chat-specific replies, muting and polling

RQ5: Guidelines and Recommendations: VC Tools

For Software Developers:

- Add image and light quality adjustments
- Customisable screen layout
- Don't limit number of participants that are allowed to share content simultaneously
- Perform heuristic evaluation for UI
- Use Gather's approach to breakout rooms
- Prioritise implementing all beneficial features to a decent standard rather than omit some to perfect others

For Users:

- Use intact, high quality hardware
- Adjust room lighting
- Minimise background noise
- Remain engaged and avoid multitasking
- Take action to reduce internet lag
- Avoid video calls with large groups
- Pick group activities to strengthen bonds

Conclusion

Limitations:

User Study: limited number of participants, quality of responses

Systematic Literature Review: limitations in search engines, length of keywords, number of results

Hands-on Review: access to only one OS and device, no systematic review for identifying all available Chat/VC systems

Future Work:

- More funding and time would allow testing of a wider range of free and paid software
- Create prototype of ideal chat/VC system for social interaction among students.

Questions

Thank you for listening and do you have any questions?