



Smartphone-based learning information management

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Abstract

Information management skills are essential for students. This research aimed to identify and describe the understanding, experience, awareness, and meaning of Masters & Doctoral students in managing lecture material files. This qualitative descriptive research used a phenomenological approach. The research subjects were 10 Masters & Doctoral students. This research produced the following findings: students have understood personal information management as managing information and organizing data, and the student experience in managing learning information, including downloading, skimming, creating folders, naming files, backing up files, writing notes, and grouping files in private WhatsApp groups. The act of managing information is based on control from the outside, such as being influenced by friends when situations and circumstances are urgent or needed, and the quality of the smartphone, while control from the inside is only because they often forget. The critical meaning of implementing personal information management is that it is a matter of convenience and self-awareness. This research benefits the expansion and development of the educational technology area, especially the management area.

Keywords: Information management; instructional; learning; personal information management; smartphone

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1. INTRODUCTION

Educational technology as an applied science uses various scientific disciplines to expand its fields of study, including philosophy, communication, information, psychology, economics, sociology, management, and others (Miarso, 2011; Syafril et al., 2018; Godsk & Møller 2024). Recent educational technology studies emphasize investigating ethical issues, namely the ethics of using technology or media as processes and resources in learning and learning practices (Januszewski & Molenda, 2008). A shift in the view of learning and learning that is more constructivist brings technology to play a facilitative role rather than controlling learning, that is, not only to present information and transfer information but to create an environment where learning is more accessible (using) (Januszewski & Molenda, 2008; Teng & Wang 2021). Facilitating learning and learning in educational technology includes environmental design, providing tools, and managing resources (Januszewski & Molenda, 2008; Jafar et al., 2021). Focusing on the resources, educational technology includes people, technology, equipment, and materials specifically designed or used to facilitate learning and learning. Resources that need to be utilized include ICT technology and community resources such as zoos, museums, libraries, and people with special skills or knowledge. Meanwhile, deliberately designed resources include CDROMs, websites, printed or digital books, and audio and video recordings (Januszewski & Molenda, 2008). Educators acquire new tools, skills, and create new resources, students can group and find their resources, and educational technologists expand resource lists (Januszewski & Molenda, 2008; Vilarinho-Pereira et al., 2024).

Being complacent in creating or using resources causes the management element to be given less attention. This has an impact on a culture of excessive information consumption. Information overload in a learning environment can come from various sources, such as complex course content, excessive reading, many topics in one lesson, long videos, and too many resources in a course, to name a few (Bayne & Inan, 2022; Shanshan et al., 2021; Chen et al., 2023). Therefore, the problem of information overload challenges students' experiences in learning services (Lin et al., 2022). Interaction between lecturers and students and among lecturers or students often results in the production of a lot of learning information (Nwagwu & Donkor, 2021). Through the internet and other information and communication technologies, lecturers and students create learning resources, including lecture notes, lecture materials, video presentations, supplementary materials, and communication tools, which are very abundant (Nwagwu & Donkor, 2021; Radović, 2023). This results from the lecturers' assignments, such as presentations, workshops, articles, and other involvements.

Research result Ono (2022), in an article titled "Unlock the information advantage to combat information overload," states that the total information created, captured, copied, and consumed is expected to grow to 181 zettabytes by 2025. OpenText survey findings in 2022, 80% of respondents experienced information overload; this shows an increase from the previous survey's results, namely in 2020, which was only 60% (Ono, 2022). The average person consumes four articles, 8200 words, and 226 messages daily (Heyday, 2022). Most people have experienced it, but only a few realize how serious this problem is. Increasing access and abundance of digital or online information creates an urgent need for individuals to have the ability or skills to manage information (Sajidan et al., 2023). The information overload phenomenon can be handled by implementing unique methods while managing and storing personal information. Information management is at the forefront of a highly digital world and has the potential to shape the direction of our future for the better (Barnes, 2020).

Personal information management is a concept that deals with information overload. Personal information management (PIM) refers to an individual's approach to searching, obtaining, creating, storing, organizing, preserving, retrieving, using, distributing personal data and information for various purposes and deleting (Diekema & Olsen, 2014; Januszko Szakiel, 2020; Jones, 2007; Sharma et al., 2021; Yasmin et al., 2019). PIM is the study and practice of maintaining, retrieving, using, and distributing information needed to fulfill life goals (Aisyah, 2018). Personal information management is activities that people use to obtain, store, organize, and retrieve information (Alon & Nachmias, 2020). Interest in the study of PIM is on the rise, driven by a growing awareness that new applications and gadgets are providing the help they all want, often at the expense of increasing the overall complexity of PIM (Jones, 2007). The PIM devices most often used by students are PCs/computers, laptops, and smartphones (Dilhani, 2021; Faize et al., 2018).

But once again, managing learning information in a personal storage space takes work and is prone to errors. Abundant learning information causes uncertainty in sorting and scanning information (information filter). Individuals discover information that is not actively sought but is still relevant or exciting. Individuals discover information that is not actively sought but is still pertinent or exciting. So, individuals often need help to sort and scan the required learning information from most information accessed (Barreau & Nardi, 1995). Information accessed if it is inappropriate or unsuitable and exceeds the cognitive threshold will cause cognitive discomfort or cognitive burden on the recipient of the information (Inayaturobbani et al., 2021). Besides that, 75% of people accumulate the information they have, and when they search again, they don't find it (Larasati & Prasetyawan, 2020). If the information obtained and owned by students is not organized correctly, it will only cause problems in the future.

Students find it difficult to manage digital/online learning information because they usually store printed information by photocopying and storing it in the form of files or folders with random classification labels, whereas in digital form if at any time they need the file, they have to open various other folders (Sawant & Manchekar, 2019). In the digital space, archives often experience problems and difficulties in deciding on appropriate classifications, for example, alphabet and context or scope (Trullemans & Signer, 2014). Students tend to group files rather than classify them (Dirmansyah, 2016). Aisyah's (2018) research results concluded that students still often ignore the importance of immediately managing files that have just been found on the internet. Thus, forgetting file names and storage locations is the main problem that most often occurs in the practice of managing personal digital archives among students (Aisyah, 2018). Sometimes lecture material files can also be lost because they are deleted. After all, the storage space is full. So, it is necessary to have a backup to secure the lecture material files. A common obstacle that students face when storing information is insufficient storage space (Dilhani, 2021).

This condition was strengthened by semi-structured interviews with several Universitas Negeri Yogyakarta (UNY) Masters and Doctoral students who stated that using the WhatsApp application on smartphones was a means of communication and conveying information during online learning. Students receive much learning information uploaded or shared as lecture material files. Sometimes, students need more time to read and download, so they have to find files that have been buried by chat/messages again (Chen Levi, 2019; Liu et al., 2020). Apart from that, classifying or cataloging files that students' download is usually still in the form of numbers, making it difficult to find information because the file names are unclear. Ideally, master's and doctoral students' awareness of managing learning information is better because they already have undergraduate-level experience. Research by Aladjem & Hardof (2016) shows that older students (at colleges or universities) have better information management practice abilities than younger or lower high school

students because they are only oriented toward short-term functional goals. However, in reality, its continued implementation has yet to be optimal.

Therefore, studies and ethical practices in managing learning information resources at the master's and doctoral education levels also need to be studied. The management of learning information will be an essential area of study in educational technology in the future (Seels & Richey, 1994). Information management will provide easy access (improving performance) and availability of resources for learning activities (Haryanto, 2015). Information management also has a role in changing the curriculum and implementing learning design (Warsita, 2013).

1.1. Purpose of Study

This research aims to explore the understanding, experience, awareness, and meaning of UNY Masters & Doctoral students in managing learning information on smartphones as the first step in expanding and developing the field of educational technology in the realm of learning information management.

2. MATERIALS AND METHODS

The type of qualitative research used in this research is phenomenology. Phenomenology is the study of human experience (Moustakas, 1994). The general focus of this approach is to examine the essence and meaning of emerging human experiences and consciousness (Moustakas, 1994; Priyoyuwono, 2008; Tuffour, 2017).

2.1. Participants

This research's data sources are primary and secondary. Primary data source from 10 UNY Masters & Doctoral students. Ten subjects in phenomenological research are an adequate standard sample (Creswell, 2015). Meanwhile, secondary data sources include documentation of photographs, information overload display of lecture material files, and management of lecture material files on smartphones.

2.2. Data collection instrument

The most important data collection process in the phenomenological approach is in-depth interviews using first-person stories in informal and formal conversations and interviews (Moustakas, 1994). The human instrument or researcher is a crucial instrument that plays a significant role in planning and implementing the collection. So, it is necessary to determine focus, select instruments, analyze data, and draw conclusions from the findings. Apart from that, in determining the focus to be obtained, the researcher uses a guiding tool, namely an interview protocol in the form of a form prepared by the researcher, which contains instructions for the interview process, questions, and space for recording the informant's responses (Creswell, 2015).

2.3. Data validity and analysis

The validity of the data serves to prove the findings with the reality researched in the field. Checking the validity of the data uses triangulation, member checks, and external audit techniques (Creswell, 2015). According to Moustakas in Hasbiansyah (2008), there are essential procedures in phenomenological data analysis: horizontalization, clusters of meaning, and description of essence.

3. RESULTS

The presentation of data results in this research is based on meaning units consisting of 4 themes, namely, understanding, experience, awareness, and meaning. Each theme comprises several sub-themes accompanied by verbatim statements or expressions spoken during the interview (table 1).

Table 1
Units of meaning

No	Meaning Units		Examples of Verbatim Statements
	Theme	Sub Theme	
1	Students' understanding of personal information management	Information management Manage information Organizing Data	OK, if this is clear, what it means is that we can manage the information that we receive or enter. If that's the case, bro, how do we manage information Personal information management is a way to manage my data.
2	Personal information management experience for lecture material files on smartphones	Download Read Folder	I usually download many things first, bro; download first. When I got the information, I tried to filter it by reading it and whether it matched what I needed. Yes, it's in folders like that, so if it's in the semester now, it means semester 2 is by what course, then later it goes into a book, a journal, or a paper or PowerPoint-like that.



Figure 1. Course Folder

Private
Whatsapp Group

All the information I get is essential, bro; I immediately share it with my private group.

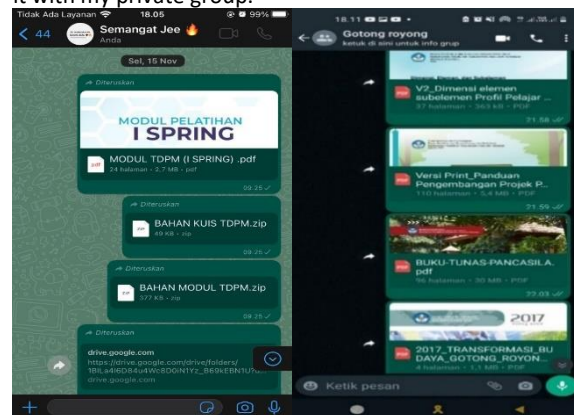
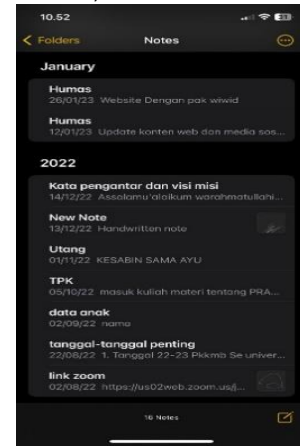


Figure 2. Material in WhatsApp Groups

Noted

One of the things that I need clarification on is that I write down notes on my cell phone, bro. First, I note down the data



or essential sentences.

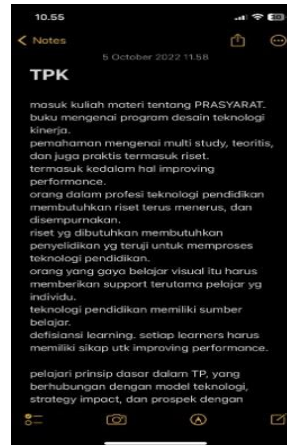


Figure 3. Note

3 Awareness of personal information management of lecture material files on smartphones

File naming
Backup

If I manage it by name, it will be easier to find. So, I don't folder it to my laptop; no, I don't folder it to my cellphone anymore because, of course, it's the same; even though it's a folder, it still overloads some cell phones, which may not have optimal storage.

Ease of access

So, what's more, sir, it's easier to open, so when you open it, it opens straight away.

Friends

So, when I was a bachelor, I saw a friend who had a group like that. When I was told this was my particular group when I wanted to transfer data, I didn't need to unmute my cell phone; I just opened WhatsApp web.

Easy to forget

Erm, I'm very conscious because I forget quickly, so I gave it a week or two weeks, but after that, if it's been two weeks, the files we've received are starting to get a lot.

Need

I need this so that it is easy to access the materials that have been obtained.

Time and
Circumstances

Yes, it's different with time and circumstances, maybe this is a personal reason, sometimes most people don't have time to go there, because they feel it's not urgent at the moment.

		Smartphone Quality	Smartphones have limited capacity, especially if it's Android; we could add some external Qard memory. But if we have to repurchase an iPhone, it's hard to use anything plugged into a USB, which can damage the charger.
4	The importance of personal information management for lecture material files on smartphones	Convenience	Ok, the important thing is. First, it is related to how easy it is for us to reaccess it later; secondly, it will make our cell phones easier, too, so they are lighter.
		Self-awareness	That's personal information; it's self-awareness, bro; people usually take it for granted.

4. DISCUSSION

Understanding is born from something a person experiences, knows, and remembers. What is known and remembered from student experience regarding personal information management is the same. Only the use of pronunciation terms is different.

Personal information is information that belongs to each individual. According to Jones (2007), Personal information is stored by someone directly or indirectly under their supervision. PIM refers to the practice and research of a person's activities in obtaining, creating, storing, organizing, maintaining, rediscovering, using, and disseminating information needed to fulfill the tasks (Jones, 2007). Based on research findings, personal information management is the management of information obtained or how to manage incoming personal information. PIM activities that students carry out include storing and naming files or materials. It also classifies or maps information to determine specifications based on courses or per file.

Information cannot be separated from data. According to Siagian (2002), data is "raw" material, as raw material data is input which, after processing, changes its form into output called information. Raw materials are processed to present information (Sutabri, 2005). Data comes from someone's information or documents, both printed and electronic (Rusdiana & Irfan, 2014). Another finding is that personal information management is the process of managing data. This data includes lecture data, identity cards, curriculum vitae, diplomas and transcripts, and others, which must be continuously accessible. If you implement personal information management, your data could be recovered, making things easier.

One proposed way to manage information well is via smartphone, which students need because of its connectivity and flexibility. Students' experiences managing learning information with smartphones are how they operate or organize the information they have or obtain. Statements or answers expressed by students regarding how to manage information become separate steps for overcoming information overload. Personal information management is one solution to overcome information overload (Bawden & Robinson, 2008).

PIM refers to the practice and research of a person's activities in obtaining, creating, storing, organizing, maintaining, rediscovering, using, and disseminating information needed to fulfill the tasks (Jones, 2007). PIM has three components: discovery (finding), storage (keeping), and meta-level activity (Jones, 2007). Information discovery or search is the process of finding and retrieving information that is intentionally stored, or that has just been discovered in a personal information space. Storage is the next activity a person faces when they find information, namely placing it on storage media. Meta-level activity is related to organizing files (naming files, classifying them), maintaining them, managing information flows, measuring information needs, and evaluating PIM strategies.

Based on the findings, downloading is the way they get information. Research results indicate that downloading is a way for students to obtain information. From downloading, they can get the required course

material. Usually, students download lecture material files via social media, such as WhatsApp and Telegram. After downloading, students sort it out to determine whether the content is relevant or essential; one way is by reading. Speed reading is finding information that suits your needs (Al-Youzbaky & Hanna, 2022). However, out of ten students, only three carry out personal information management by reading. Afterward, they will save what is necessary or relevant in folders, which they will adapt to the current semester and courses as classifications. This aligns with the research by Namdari & Farajpahlu (2022), organizing text, PDF, and PowerPoint files based on subject folders.

A smartphone, via the note's application, can be used to note important things. PIM also places particular emphasis on organizing and maintaining collections of personal information. Examples include paper documents, electronics, email messages, web-references, and notes to save and use later or repeatedly (Jones, 2007). Organizing files can also be done using the file naming method. An essential part of personal information management is naming files, which aims to make them easy to remember and find again (Jones, 2007). However, it is unfortunate that only one student called the file.

In addition, the growth of social media has expanded a powerful and complex information landscape where the management of personal information is increasingly widespread (Ali & Warraich, 2019; Judith, 2022). WhatsApp is a social media whose initial purpose was to communicate but has now been expanded to share information (Syafitri et al., 2022). However, it would be best to remember that the main challenge in using WhatsApp social media on a smartphone is storage capacity (Ratnam, 2022). So, it is necessary to have a backup to secure the files so they are not lost and can be used in the future. You can back up using other devices, such as a laptop or Google Drive, with a larger storage capacity than a smartphone (Mkhai & Rashid, 2021). This is a process of maintaining information that will be used in the future.

New findings from this research show that the application of personal information management via WhatsApp can be demonstrated by using a private WhatsApp group containing one person to store newly obtained information so that it is not lost. You are organizing personal WhatsApp names according to course names or your name. Storage in private WhatsApp groups tends to group files. The methods above are intended for easy access, which is an advantage for students when implementing personal information management. However, the implementation could be more optimal because it is still limited to searching and saving. Management of information through reading still needs to improve.

Personal information management has been on the rise in recent years, driven by a growing awareness that new applications and gadgets provide the help they all want, often at the expense of increasing overall PIM complexity (Jones, 2007). Students must be aware that their course material files require management throughout the cycle. Files stored for future reuse need to be managed immediately. Research results of Aisyah (2018) show that students know the importance of managing personal information but only do it occasionally. So, it requires orientation of thoughts and actions (intentionality) aimed at objects, namely lecture material files.

The latest findings in this research make students aware of the importance of managing lecture material files. UNY Masters and Doctoral students only knew but did not immediately act. New intentionality will emerge because of frequent forgetting, being influenced by friends, urgent needs, situations, circumstances, and the quality of the smartphone. Easy to forget is a deficiency in remembering what previously had to be done, namely managing the files obtained. Then, time and individual circumstances cannot be predicted, so individuals only manage information when it is urgent or needed. Apart from that, the quality of a smartphone

that has a small storage capacity, such as an Android smartphone, will make you aware of the importance of immediately managing information so that if the smartphone you have has a large capacity, such as an iPhone, students will be more likely to procrastinate managing information.

Similar to students' awareness of information overload, awareness to manage personal information immediately is still pragmatic and influenced by external factors. This indicates that motivation, self-regulated learning, and independence of master's and doctoral students are still lacking. Managing personal information requires internal and external motivation (Doulani et al., 2022; Hwang et al., 2018). Ideally, master and doctoral students with previous experience will be more independent, not just pragmatic.

Information experience adopts a constructivist view, understanding that reality and meaning are constructed by human interaction with the world (Prasetyawan, 2019). Information experience research focuses on the experience and overall view of an individual's relationship to information (Bruce et al., 2014). The comprehensive view is related to the awareness that produces meaning in managing personal information.

The critical meaning of managing personal information is convenience. It does not require more performance to handle information overload of lecture material files so that it can be prevented early or even when it occurs. The conveniences obtained include access and time, which only require a short time (Haryanto, 2015; Mkhai & Rashid, 2021). So, self-awareness needs to be formed from the start and regularly involved in PIM activities (Samuel, 2022).

5. CONCLUSIONS

Students already know and understand personal information management and its importance. However, students' ability to manage learning information on smartphones still needs to be improved as an indicator of the student experience in managing learning information, namely just downloading, skimming, creating folders, naming files, backing up files, writing notes, and grouping files in private WhatsApp groups. So, students' ability to manage learning information on smartphones involves more searching and saving than reading.

Student awareness in managing learning information still needs to be higher, and students are more reactive than proactive even though they realize that managing information can be convenient. However, managing information is still based on control from outside, such as being influenced by friends when situations and circumstances are urgent or needed, and the quality of the smartphone, while control from within is only because people often forget. So, it is yet to be an action that grows from internal motivation or independence. Thus, how students learn still needs to be more pragmatic and idealistic.

Recommendations for further research are on the motivation and self-regulated learning level of students in managing learning information on smartphones.

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