

## Enhancing Knowledge Sharing: Impact of KM Tool Design

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### Abstract

In today's fast-paced academic environment, effective knowledge-sharing tools play a crucial role in enhancing collaboration and productivity among students. This study investigates the impact of knowledge management (KM) tool design on knowledge recall and interpretation. Specifically, it evaluates the effectiveness of three communication modalities—Kanban boards, direct messaging, and face-to-face meetings—in facilitating knowledge transfer among university students. A study involving 20 participants was conducted, where web development tasks were assigned and completed using these three modalities. Participants' recall and interpretation abilities were measured and analyzed using a Likert scale. The results indicate that Kanban boards and direct messaging significantly enhance knowledge retention, whereas face-to-face communication improves comprehension. These findings suggest that optimizing KM tool design according to task complexity can improve collaborative learning outcomes. Future research should explore advanced rating methods, broader participant demographics, and cross-disciplinary applications to refine KM tool effectiveness.

**Keywords:** Delegation Strategies; Knowledge Transfer; Productivity Optimization

### Introduction

In the dynamic landscape of contemporary academia, effective knowledge management practices play a pivotal role in sustaining academic excellence and fostering innovation. Central to these practices is the facilitation of knowledge recall and interpretation among university students, ensuring that valuable insights are not only retained but also comprehended and utilized to drive academic success. Amidst the plethora of knowledge management tools and strategies applicable in the university setting, three prominent modes of communication stand out: the Kanban board, direct messages, and face-to-face meetings.

The Kanban board, rooted in lean manufacturing principles, has become a staple tool in knowledge work environments for its ability to visualize workflows and optimize task management. By breaking down complex projects into manageable tasks and organizing them into columns representing different stages of completion, the Kanban board provides a clear and structured framework for teams to track progress and prioritize work. [1] suggests that the visual nature of the Kanban board enhances cognitive processes associated with memory and recall, as individuals are more likely to retain information when it is presented in a visual format. Moreover, the transparency and accessibility afforded

by the Kanban board promote knowledge sharing and collaboration within teams, as members can easily identify bottlenecks, dependencies, and opportunities for synergy. However, the effectiveness of the Kanban board in facilitating knowledge recall and interpretation may vary depending on factors such as the design of the board, the level of engagement from team members, and the alignment of the board with the actual goals and workflows.

Direct messaging platforms, ranging from email and instant messaging to collaborative workspace and project management tools, have revolutionized communication in the digital age by enabling real-time, asynchronous communication across geographically dispersed teams. While direct messaging offers the advantages of immediacy, convenience, and documentation, its impact on knowledge recall and interpretation is nuanced. On one hand, direct messaging facilitates rapid information exchange and clarification of doubts, reducing the cognitive load associated with information retrieval and interpretation. On the other hand, the transient nature of messages and the abundance of communication channels can lead to information overload and fragmentation, hindering knowledge retention and comprehension. Furthermore, the lack of visual cues and contextual information in text-based communication may impede the depth of understanding and contribute to misinterpretation or miscommunication. We aim to understand the depth to which these issues plague the current scholastic communication landscape.

Face-to-face meetings remain a cornerstone of academic communication, providing a rich and dynamic environment for interpersonal interaction, collaboration, and knowledge exchange. Unlike digital communication channels, face-to-face meetings offer non-verbal cues such as facial expressions, body language, and tone of voice, which play a crucial role in conveying meaning and fostering rapport among participants. [2] suggests that face-to-face interaction enhances the depth of understanding and facilitates the synthesis of complex ideas through real-time feedback and dialogue. Additionally, the social dimension of face-to-face meetings promotes trust, empathy, and psychological safety, which are essential for effective knowledge sharing and interpretation. However, the logistical challenges and time constraints associated with face-to-face meetings may limit their frequency and accessibility, particularly in groups with geographically dispersed teams or remote work arrangements.

While these communication modalities differ in their mechanisms and mediums, their impact on knowledge recall and interpretation within academia is profound and multifaceted. Understanding how the design and implementation of Kanban boards, direct messages, and face-to-face meetings influence the retention and understanding of knowledge is essential for devising effective knowledge management strategies tailored to specific needs.

## Related Works

Any research trying to streamline pre-existing processes is an age-old interest for our capitalist society where efficiency for the sake of revenue is of paramount importance. With the rise of internet and new technologies since the internet, this has only hastened as we try and do better with what we have.

Before our research, [3] explored the intersection of organizational culture, knowledge management and organizational learning. While their research focused on the automotive industry and tried to formulate industry specific guidelines, we will be taking a wider approach and focusing on the communication between different parties within any academic scenario.

A similar question was asked on [4] where the role of communication in knowledge management was studied to know how the transfer of knowledge depends wholly on sufficient communication. While [4] provides us with the basics that managers with better communication skills can better transfer their knowledge to their subordinates, we try to focus on the design of the medium where the communication is taking place and how that design makes a difference on the quality of the knowledge transfer.

A more nuanced view on the importance of these tools of knowledge sharing was conducted by [5]. [5] focused on the use Kanban boards to alleviate communication and collaboration challenges on global software development. This is a very close comparison to what we aim to research as it already dissects into the communication issues and establishes the challenges faced by a globally distributed software development context. With the view on [3X5], we aim to expand its research to three main knowledge sharing tools.

## Methodology

### Participants

A total of 20 participants (12 male, 8 female) were recruited for this study. Participants were selected based on their availability and willingness to engage in the research activities. The participants ranged from age 18 to 28, most of whom were pursuing their undergraduate degrees. The sample size was deemed sufficient to provide a diverse range of perspectives while ensuring manageable data collection and analysis.

### Experimental Design

We rate the efficiency of knowledge sharing on two main bases: recall and interpretation. Being able to remember the information provided to a person has long been regarded as a skill for a high performer. But just remembering the information is not enough in the fast-paced environment of today's workplace. The quality of what the person understands when they are provided with the information is also of paramount importance. So, in context to today's workplace environment, we judge the quality of knowledge transfer on recall and interpretation.

We used Trello for Kanban boards, Discord for Direct messaging and face-to-face conversation for meeting modality. These methods sufficiently represent the work environment for a modern workplace.

Tasks were created typical of a web development work scenario. They are numbered from 1 to 10 for every session and were designed to encompass a variety of complexity levels and subject matters. Some of the tasks were:

<b>Task Number</b>	<b>Task</b>
1	Update the website's footer with current copyright year.
2	Change the font size and color of all headings on the homepage.
3	Add social media icons to the website header and link them to respective profiles.
4	Implement a responsive design to ensure the website looks good on all devices (desktop, tablet, mobile).
5	Create a new landing page for a promotional campaign, including a call-to-action button.
6	Optimize images throughout the website for faster loading times.
7	Implement a sticky navigation menu that remains fixed at the top of the page as users scroll.
8	Customize the website's contact form to include additional fields and validation.
9	Develop a custom interactive map feature displaying locations of physical stores or service areas.
10	Design and integrate a complex e-commerce checkout process with multiple payment options and order tracking functionality.

**Table 1:** Web Development Tasks.

The tasks were distributed to participants through three different mediums: Kanban boards, direct messages, and face-to-face interactions. This tripartite approach allowed for the examination of knowledge recall and interpretation across distinct communication modalities.

### Data Collection

Following the completion of each task, participants were quizzed on their recall of the task details and asked to provide their interpretation of the task requirements. Responses were recorded and rated on a Likert scale [6] ranging from 1 to 5, with 5 indicating the highest level of accuracy and comprehension, and 1 indicating the lowest. The rating scale was designed to capture the participants' perceived effectiveness of each communication medium in facilitating knowledge recall and interpretation.

**Data Analysis**

The ratings provided by participants for each task and communication medium were aggregated and analyzed using statistical methods. Descriptive statistics, including frequency scores and grouping, were calculated to assess the overall performance of each communication medium in terms of knowledge recall and interpretation.

**Results**

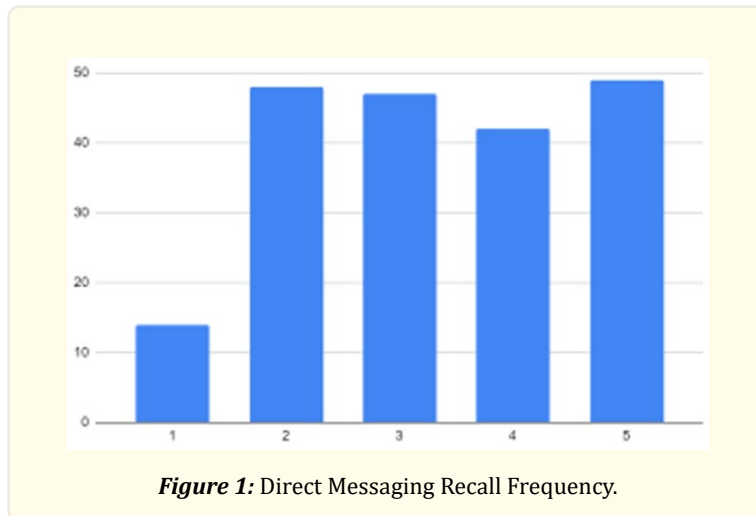
The ratings we collected from the 3 methods were tabulated as shown in the table below.

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>...</b>
A	4	5	4	2	...
B	2	5	2	5	...
C	2	2	4	5	...
D	2	3	2	4	...
E	5	3	3	2	...
F	2	4	2	4	...
G	2	4	2	5	...
H	4	2	2	5	...
I	4	5	3	2	...
...	...	...	...	...	...

**Table 2:** Direct Messaging Recall Rating.

This is the rating table for Direct Messaging. The 20 participants are given names A to T. The tasks are named 1 to 10 shown here from the top row. We have two such tables per communication method, hence six tables in total. From these tables, we can extract the trends within the rating rather than singular performances.

**Charts**



**Figure 1:** Direct Messaging Recall Frequency.

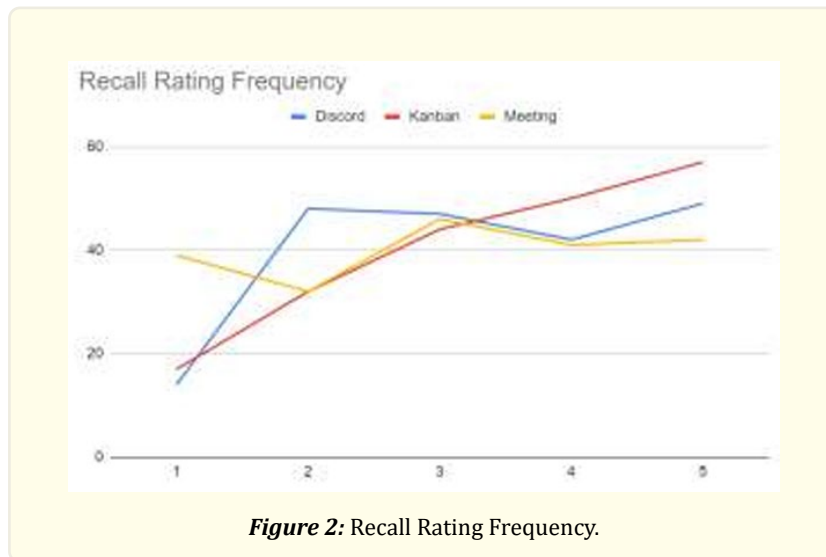
We get six such charts for both recall and frequency for direct messaging, Kanban board and face-to-face meetings. Although the charts do not give us significant information, overlaying this information on top of each other does.

**Data Analysis**

We analyze the data we got to figure out patterns and to find more information. Here is the frequency of each of the ratings for Recall and Interpretation:

<b>Method/Rating</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Direct Messaging	14	48	47	42	49
Kanban Board	17	32	44	50	57
Face-to-face	39	32	46	41	42

**Table 3:** Recall Table.



**Figure 2:** Recall Rating Frequency.

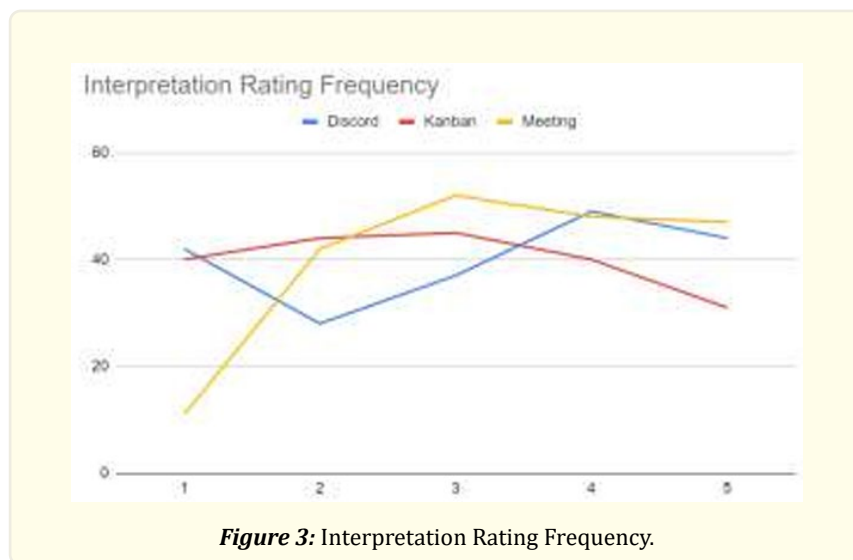
As we can see, we see a significant grouping of higher ratings (4 and above) for both Kanban boards and for Discord messaging (direct messages). There is no significant uptick for face-to-face meetings and follows a standard distribution.

Both Kanban boards and Direct messaging consists of using technology to convey information. While they do convey the information in different forms, this significant grouping of higher ratings for recall tells us that having the information in a written-out form helps us remember the information better.

Between Kanban board and Direct messaging, Kanban has a higher frequency of higher ratings, which can be explain as we use direct messages in our day-to-day activities, while a Kanban board is only ever used at jobs to issue tasks. Overall, for the ability to recall, Kanban board rates the highest above messaging and meetings.

While trying to interpret the tasks provided to them, face- to-face meetings did the best over the other methods. We see a significant grouping of higher ratings for meetings while both Kanban boards and Direct messaging falter to provide any evidence for their use in tasks which require a high level of comprehension ability.

This result may be explained as face-to-face meeting is how we communicate in our day to day lives. Everything we know about the world was achieved by observation and direct communication, hence our practice in this method is just on a different level compared to other methods which rely on technology and in some way isn't "natural".



Once again, the same argument goes for Direct messaging edging out Kanban boards for interpretation of tasks: we use Direct messaging in our daily lives to communicate hence we may just be better at understanding texts than in the abstract structure of Kanban boards.

## Discussion

In this study, our aim was to investigate the dynamics of task delegation among university students and explore the impact of different delegation approaches on project outcomes and learning experiences. Our primary objective was to identify effective strategies for task delegation that optimize productivity and enhance academic success in the university setting.

Our findings suggest that effective task delegation is crucial for managing workload and optimizing productivity in collaborative academic projects. We observed that certain delegation strategies, such as utilizing Kanban boards for task visualization and organizing face-to-face meetings for in-depth discussions, can significantly enhance communication and coordination among team members.

Furthermore, our study highlights the importance of considering the nature of the task when delegating tasks within student teams. By matching tasks to students based on the nature of the task, educators can foster a sense of ownership and motivation, leading to better project outcomes and increased satisfaction among team members.

Overall, our research underscores the significance of effective task delegation in promoting academic success and enhancing the learning experiences of university students. Moving forward, it is essential for educators and institutions to continue exploring innovative approaches to task delegation that cater to the evolving needs of students and empower them to excel in their academic pursuits.

## Conclusion

Though our methods were mostly crude, we did find some trends in the data too significant to call statistical anomalies. We can arrive on two main deductions based on the results.

The first one being the use of either Kanban boards or Direct messaging while trying to share knowledge which is required to make an impression on the minds of the users. For example: a simple but routine task should be provided to the user in writing using Kanban board or through Direct messages. Not only can they remember that information better, but they can also go back to that information later and brush up on it if required.

The second recommendation would be to focus on face-to-face communication when trying to transfer knowledge which has a high level of complexity and pair it with written information to ensure they understand the information trying to be conveyed. As an extra edge, users can also ask immediately when they don't understand something while they are face-to-face with the source, which may not always be the case with Kanban boards and Direct messaging.

## Future Scope

While results show that even though we obtained satisfactory outcomes, they can still be enhanced. Here are some fixes we can make for better outcomes:

- Make use of better rating methods. While the rating method we used was the best we had considering the scope of the research, issues like personal bias and recency bias could lead to skewed views of our rating. There is always a chance we as humans make mistakes or are influenced by aspects, we aren't aware of. Hence an automated rating scale would make for a better assessment of the participant's recall and interpretation.
- Include more analytics. The data analytics we performed included just frequency mapping and charting. While it provided some insight into the human mind, a more in-depth analysis would likely help us get more in touch with the issue at hand.
- Ensure more task parity. While we did choose the tasks for the participants from a pool of web development duties, some were harder to understand and remember than others. Moreover, we choose web development tasks due to our participants' background, but the trend that we found about recall and interpretation may just be prevalent among the tech literate crowds. A more controlled tasks pool from tasks from different areas would help get broader ideas about knowledge sharing.

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