

Are visual representations always helpful in the communication of knowledge? Discuss with reference to the human sciences and mathematics.

Student's Name

Institution

Course Code

Instructor

Date

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The prescribed topic explores visual aids within the context of conveying information. Communication of knowledge refers to verbal and visual processes of conveying information to an informal and formal audience. Visual representations refer to visual aids such as diagrams, graphs, and charts that convey certain knowledge. Always helpful is a crucial term in the question because it asks us to gauge whether visual representations are useful under all circumstances. As such, it becomes contentious because we must explore it through the term 'always helpful.' There is no doubt that visual representations help communicate knowledge because they are utilized widely in teaching knowledge in formal and informal settings. However, to what extent can we term them as always helpful? This inquiry will explore the role of visual aids to determine whether they are always helpful when conveying social and mathematical knowledge.

Mathematics

In Mathematics, conveying ideas is very important, especially in research and education. Mathematics, as an area of knowledge, contains multiple disciplines which rely on visual aids to convey knowledge adequately. While verbal explanations and written symbols are necessary, visual representations are pivotal in some mathematics disciplines. In fact, some disciplines, such as geometry and topology within the area of knowledge, rely entirely on visual representations. Visual representations such as diagrams and graphs are vital in understanding the relationships between shapes, angles, and dimensions in geometry. Without visual aids, it becomes challenging

to comprehend the properties of complex shapes, such as three-dimensional objects. A cube, for example, needs visualization to help those receiving the audience to understand a cube's six faces, twelve edges, and eight vertices in three-dimensional space. An example that illustrates the claims above is the design of bridges and buildings. Engineers and architects rely heavily on mathematical concepts such as geometry, trigonometry, and calculus in their designs. In addition, they use visual aids, such as blueprints and 3D models, to visualize the structural components of the designs and ensure their accuracy (Pei et al., 2015). Engineers would rely entirely on visual aids to design a suspension bridge and calculate the forces acting on the structures. They go to the extent of using computer-generated models and visual aids to show the bridge would function and look when completed. This example shows that visual aids are crucial for conveying mathematical knowledge. Some disciplines which lead to careers, such as architecture and engineering, rely on visual aids to simplify abstract ideas and communicate them in a way that is easily understood.

Alternatively, there is an argument that visual aids are not the most effective means of communication. Visual aids can oversimplify or overcomplicate mathematical concepts, leading to confusion and misunderstanding. In addition, there is a possibility that they can be manipulated, which makes them misleading. Individuals may misinterpret the meaning of the diagrams or graphs presented to them. In statistics, visual aids can be manipulated, and they can also oversimplify the knowledge communicated. Graphs and charts are used to represent data. However, they are limited because they can be manipulated if the axes are not labeled correctly or if the scale is manipulated. Some people compress the bar graph to make small differences appear larger. Sometimes, the scatterplots are not well labeled, leading to misinterpretation of the

relationship between the variables being conveyed. In addition, visual aids can overcomplicate mathematical knowledge. Complex diagrams and graphs can be overwhelming and difficult to comprehend, especially for people with limited mathematical knowledge. An example that indicates contexts in which visual aids are not always helpful in conveying knowledge is financial data during the 2008 crisis. During the 2008 financial crisis, many investors relied on complex financial models and graphs to make investment decisions. This led to catastrophic losses (Tseronis, 2015). The models and graphs oversimplified the risks involved in the investments, leading to a false sense of security, especially in the housing market. Investors and the banking industry believed that the housing market would never collapse, leading to more risky investments, ultimately leading to the market's collapse. This example shows that in some contexts, visual aids can oversimplify complex concepts, which leads to misunderstandings and misinterpretations. As such, under certain contexts, visual aids are not helpful when conveying mathematical knowledge.

Human Sciences

In Human Sciences, there is an argument that visual aids are prone to subjectivity, bias, and misrepresentation. This is because knowledge from human sciences elicits interest from people with ideological intentions to misrepresent the meaning and conclusions to frame information through their ideological lenses. Knowledge in the human sciences is often about human behavior, which is complex and multifaceted. This complexity means that there are multiple interpretations of information. This can lead to subjectivity and bias, where people misinterpret and manipulate information to mislead the audience to see things through their

ideological perspectives. This also happens in knowledge production, where research findings can be influenced by the researcher's theoretical perspective and assumptions. This leads to the generation of visual aids that reflect the researcher's biases rather than the objective reality of the data. In addition, people understand that social knowledge has real-life implications, which drives them to misrepresent its meaning and conclusions to fit their own agenda. This can be seen in political campaigns, which often use data visualizations to persuade voters. They manipulate the visual aids when they selectively use certain aspects of information and data to mislead the voters. An example that illustrates this happens in the United States, where the discourse on immigration is ideologically based. For example, in 2017, the Trump administration released a report claiming that immigrants drain the U.S. economy. The campaign used a visual representation, a bar graph, to show that immigrants received more government benefits than they paid in taxes (Demata, 2017). However, the graph was misleading because it did not consider that immigrants contribute to the economy by working and paying taxes. The graph was criticized for its selective use of data and was seen as an attempt to promote an anti-immigrant agenda. This example presents instances that show that visual aids can be misleading and can be manipulated to represent an ideological side. This is especially dangerous in social sciences, where the knowledge has social implications, such as determining laws and policies. Under these contexts, visual aids cannot be deemed as always helpful.

Alternatively, visual aids are widely utilized in social knowledge communication because they effectively simplify and summarize complex ideas. They also go a long way in making knowledge more accessible to a wider audience. Human sciences have concepts and theories that are often abstract and difficult to grasp. As such, visual aids provide a way to communicate

information more concretely and intuitively. Visual aids effectively communicate social knowledge by simplifying complex ideas and presenting them in a more digestible format. Visual aids are extensively used in social sciences to illustrate patterns and trends; even people with no academic background can understand the information. This allows the audience to make sense of large amounts of information and makes it easier to understand the relationships between different variables. In addition, researchers in human sciences use visual aids to summarize the process of knowledge production. This makes it easier for people to understand how researchers arrived at their conclusions. This is why visuals such as flowcharts are routinely utilized to explain the steps of conducting a research study, including how data is collected, analyzed, and interpreted. This helps to demystify the research process and make it more accessible to people who do not have a background in social sciences. An example that illustrates the importance of visual aids in conveying social knowledge occurred during the pandemic. Visual aids were widely utilized for communicating public health knowledge. The World Health Organization and countries utilized visual aids such as graphs and charts to communicate information about the spread of the virus (Delicado & Rowland, 2021). Researchers produced knowledge on the effectiveness of various public health measures and the impact of the pandemic on different communities and used visual aids to communicate the findings to the public. These visual representations helped convey important information clearly and concisely, making it easier for people to understand the severity of the situation and the importance of following public health guidelines. This example illustrates how effective visual aids are for simplifying and summarizing complex ideas. Social scientists use visual aids to make their research more

accessible and understandable to a wider audience. This helps to promote greater understanding and awareness of important social issues.

Conclusion

The inquiry has shown that visual aids are extensively utilized in conveying knowledge but have limitations and advantages. Visual representations in mathematics are essential for conveying complex ideas, while in the human sciences, they can be subject to subjectivity and bias. This shows that visual aids are a double-edged sword essential for simplifying complex ideas and increasing the audience. However, they have limitations in promoting ideological perspectives through manipulation and misrepresentations. As such, the role of visual aids requires critical thinking and careful evaluation of the data and visualizations presented to us. We must approach all visual representations with a healthy dose of skepticism, particularly when they are used to promote political or ideological agendas. At the same time, we should recognize visual representations' power in helping us better understand complex ideas and communicate knowledge to a wider audience. However, to answer the question, we can conclude that visual aids are not always helpful when conveying ideas, as there are contexts where their limitations can lead to miscommunications and misunderstandings.

References

- Delicado, A., & Rowland, J. (2021). Visual representations of science in a pandemic: COVID-19 in images. *Frontiers in Communication*, 6, 645725.
- Demata, M. (2017). "A great and beautiful wall" Donald Trump's populist discourse on immigration. *Journal of Language Aggression and Conflict*, 5(2), 274-294.
- Pei, E., Campbell, I., & Evans, M. (2015). A taxonomic classification of visual design representations used by industrial designers and engineering designers. *The Design Journal*, 14(1), 64-91.
- Tseronis, A. (2015). Documentary film as multimodal argumentation: Arguing audio-visually about the 2008 financial crisis. *Building bridges for multimodal research: International perspectives on theories and practices of multimodal analysis*, 327-345.