Review of Application Software Used in Educational Research

Lalnuntluanga Colney

Ph.D Scholar, Department of Education, Mizoram University

Abstract

Technology's role in educational research has grown in significance during the past few years. Many research methods now involve the use of application software, from data collection and analysis to interpretation of findings and writing a research paper. This article provides a review of the application software personally used by the researcher in educational research, focusing on writing tools, writing enhancement software, reference management software, data collection and analysis tools. The article also discusses the software programs and tools that researchers can use to conduct a literature review, such as academic search engines and databases. The article aims to provide educational researchers with a comprehensive review of the role of application software in the research, as well as insights into how application software can be leveraged to improve research outcomes. The benefits and challenges of using application software in educational research were also explored in this article. The article concludes by highlighting the importance of choosing the right software for the research project, as well as acknowledging the potential challenges that may arise when using these tools.

Keywords: technology, application, software, app, educational research, review.

Introduction

Technology has a significant impact on human lives as it develops and advances, making possible accomplishments that were previously unthinkable. Technology is the application of knowledge for achieving practical goals in a reproducible way. The word *technology* can also mean the products resulting from such efforts, including both tangible tools such as utensils or machines, and intangible ones such as software (Technology, 2023). An application software (software application, or application, or app for short) is a computer program designed to carry out a specific task other than one relating to the operation of the computer itself, typically to be used by end-users (Application software, 2023). Application software can be used for a wide range of purposes, such as productivity, creativity, entertainment, communication, education, and research.

In the digital age, application software has become an essential tool for conducting educational research. Educational research refers to the systematic collection and analysis of data related to the field of education. Research may involve a variety of methods and various aspects of education including student learning, interaction, teaching methods, teacher training, and classroom dynamics (Educational Research, 2023). In order to produce knowledge and evidence that may guide educational policies, practices, and decision-making, entails gathering and analysing data using a variety of research methodologies and techniques. The purpose of educational research is to expand our knowledge of the teaching and learning processes while also enhancing the quality and effectiveness of education.

Application software can assist researchers in data collection, analysis, and interpretation as well as in facilitating inter-researcher communication and collaboration, its application in educational research has grown in importance over the past few years. Researchers can collect data and analyse it more quickly and correctly with the aid of a variety of software and hardware tools, which results in better-informed decisions and, eventually, better educational outcomes.

It is not accurate to say that researchers in the field of education are lacking basic skills in using technological advancement. However, it is fair to say that some researchers in the field of education may have varying degrees of expertise and experience when it comes to using technology in their research. Many research methods now involve the use of application software throughout the research from start to finish of the research, for each step in the research like a review of literature, data collection, analysis and interpretation of findings through report writing, there is always an application software to be utilised in the research. For this reason, it is crucial that researchers have the skills and knowledge needed to utilise technology to the fullest. However, it is also important to recognize how quickly technology is developing and how difficult it can be to stay up to date with the newest application software. In addition, not all researchers could have the same access to training programmes or technological resources. For this reason, the researcher tries to provide a review of application software that may be able to help fellow educational researchers to be relevant and effective in their research.

Objectives of study

i)   To provide a review of the application software used in educational research.

ii)   To highlight the benefits and challenges of using application software in educational research.

Review of the application software used in educational research

There is several application software available for a researcher that can enhance the efficiency and accuracy of research. Here is the application software personally used by the researcher in the process of educational research:

A. Writing tools

<u>**Word processors:**</u> Nowadays, it is challenging to finish research without a word processor. A word processor is a software application used for creating, editing, and formatting text-based documents. In educational research, word processors are commonly used for writing research papers, reports, and proposals. Commonly used word processors include Microsoft Word, Google Docs, Apple Pages, and LibreOffice Writer.

The researcher personally used Microsoft Word for writing purposes. Microsoft Word has a simple and user-friendly interface that makes it easy for researchers to create, edit, and format documents. Microsoft Word is widely used and accepted, and it is compatible with other software applications, such as reference management software, statistical analysis software, and other research-related tools. It offers a range of features for formatting and organizing documents, such as headers and footers, page numbering, tables of contents, and indexing. Microsoft Word allows multiple users to collaborate on a single document, making it easier for researchers to work together on a project.

However, Microsoft Word can sometimes create formatting issues, especially when documents are shared between different operating systems or versions of the software. When multiple users are

collaborating on a document, it can be difficult to maintain version control, which can lead to confusion and errors.

Writing enhancement software: The quality and efficacy of educational researchers' research writing can be enhanced with the help of writing enhancement software. There are many different writing enhancement software tools available for educational researchers. The researcher personally used Grammarly and Quillbot as writing enhancement software.

Grammarly is an AI-powered writing assistant that helps writers to improve the quality and clarity of their writing. It offers a range of features including grammar and spelling checks, style suggestions, and plagiarism checks. Quillbot is an AI-powered paraphrasing tool that can be used to help researchers generate alternative versions of their writing. Grammarly helps to improve the quality of writing by identifying and correcting grammatical errors, spelling mistakes, and other language issues. This can be particularly useful for non-native English speakers who may struggle with the nuances of the language. Using Grammarly can save time in the writing process, as it highlights errors in real-time and suggests corrections. This can help researchers focus on the content of their research rather than getting bogged down in the details of grammar and syntax. Grammarly can help to ensure consistency in writing style and formatting throughout the research project. This can be particularly important for collaborative research projects where multiple authors may have different writing styles. Quillbot can help researchers save time by quickly generating alternative versions of their writing and can assist researchers in avoiding unintentional plagiarism by generating original and unique writing. It can assist researchers in generating fresh and novel ideas, thus promoting creativity.

While Grammarly and Qillbot are powerful tools, using them might lead to over-reliance on technology and may lead to researchers neglecting the development of their own writing skills. They are limited to the English language, so they may not be useful for researchers who are writing in other languages. The paraphrasing accuracy may not always be perfect, which may result in some errors or unintended changes in meaning. There may be ethical concerns about using AI-powered tools like Grammarly and Quillbot to generate original writing without proper attribution.

Reference management software: Using reference management software can help researchers save time and avoid errors when managing their references and generating bibliographies. The choice of referencing software will depend on the specific needs of the research project and the researcher's personal preferences.

The researcher personally used Zotero as a referencing software. Zotero is a free, open-source reference management software that can be used to store and organize references and generate bibliographies in a variety of citation styles. It also has a feature that allows users to import references from web pages and PDFs. Zotero is a free and open-source reference management software that allows users to collect, organize, and cite research sources. Zotero allows users to easily collect and organize research sources, making it easy to keep track of all the relevant information in one place. With Zotero, users can easily create citations and bibliographies, which can save a significant amount of time and effort. It enables users to collaborate with others by sharing their research libraries, which can be particularly useful for group projects. Zotero is a web-based application, which means users can access their research libraries from anywhere, as long as they have an internet connection.

However, there are also some challenges associated with using Zotero in research, like any new software, there is a learning curve associated with using Zotero. Users will need to spend some time familiarizing themselves with the software and its features. While Zotero has many features, it may not meet the needs of all researchers. Some users may find that they need additional functionality, which may require the use of other software. It may not be compatible with all types of research sources, which may limit its usefulness for some users.

B. Review of related literature

There are several software programs and tools that researchers can use to conduct a literature review. *Academic search engines and databases*: Academic search engines and databases like Google Scholar, JSTOR, and Shodhganga can help researchers to search for and access relevant literature related to their research topic. These tools allow users to filter their search results by publication date, author, keywords, and other criteria.

Academic search engines index a wide range of scholarly materials, including journal articles, conference proceedings, and dissertations. This ensures that researchers have access to a broad range of materials related to their research topic. It allows researchers to conduct searches quickly and efficiently. They also provide features such as citation tracking and alerts, which help researchers stay up-to-date with the latest research in their field. Many academic search engines provide links to full-text articles, making it easier for researchers to access the materials they need. Academic search engines offer advanced search options that allow researchers to refine their searches by keywords, author, publication, and other criteria.

However, academic search engines may not index all scholarly materials, especially those that are not in English or are not available online. Some academic search engines index materials that have not been peer-reviewed or have been published in predatory journals. This means that researchers need to be careful when selecting sources for their research. There is also a risk of over-reliance on academic search engines, which may lead researchers to overlook relevant sources or fail to develop a comprehensive understanding of their research topic. It is important to use them with caution and to supplement searches with other methods such as manual searching, citation chaining, and expert consultation.

C. Data collection

A data collection software can help the researcher in collecting data through internet by removing physical barriers to systematically collect, organize, and record data related to a research study. The researcher personally used Google forms for online data collection. Google forms is a free, web-based survey software tool that allows users to create and distribute surveys, collect responses, and analyze data. It offers basic features like multiple-choice questions, checkboxes, and open-ended questions, making it a good option for simple surveys or quick data collection.

Google Forms is user-friendly and easy to set up, making it an accessible option for researchers who may not have a lot of technical expertise. Researchers can customize Google Forms to suit their specific research needs, including adding different types of questions, incorporating images or videos, and setting up skip logic. Data collected through Google Forms is automatically saved in a Google Sheet, which can make it easy for researchers to organize and analyze the data.

However, there are also some challenges to using Google Forms in research, researchers have limited control over the data collected through Google Forms, which is stored on Google servers. This can be a concern for researchers who need to ensure data privacy and security. Participants may be less likely

to provide accurate or honest responses when completing a survey online, which can be a concern for researchers who need reliable data. Technical issues, such as slow internet connections or problems with the Google Forms platform, can impact the quality of data collected through the tool.

D. Data analysis

There are many different data analysis software options available for educational research, and the choice will depend on a variety of factors including the type of data being collected, the research questions being investigated, and the researcher's level of expertise with different software programs. Some popular options include:

Microsoft Excel: Although not specifically designed for statistical analysis, Excel is a widely available tool that can be used for data analysis, such as calculating means standard deviations, ANOVA, correlation, t-test and z-test. Excel is a commonly used software in research due to its versatility and ease of use. Excel can help in organizing large data sets, which can be easily sorted and filtered to obtain meaningful insights. Excel is a widely-used software, which makes it easy to collaborate and share data with other researchers. It is a common software that is available on most computers, making it accessible to most researchers.

One of the biggest challenges of using Excel is the risk of data entry errors, which can lead to incorrect analysis and conclusions. Excel has limited capacity and can only handle a certain amount of data, which can be a challenge for large data sets. When collaborating with others, keeping track of different versions of the same spreadsheet can be challenging. Excel is vulnerable to security breaches, and sensitive data should be protected with appropriate measures. It is not designed for all types of data and analyses, and researchers may need to use additional software to complement Excel's capabilities.

SPSS (Statistical Package for the Social Sciences): This is one of the most commonly used statistical software packages in educational research. It is particularly useful for analyzing survey data and for conducting basic statistical tests such as t-tests and ANOVA. SPSS has an easy-to-use interface, making it accessible for researchers without a strong statistical background. SPSS offers a wide range of statistical analyses, from basic descriptive statistics to more advanced inferential statistics such as regression and ANOVA. SPSS allows for easy data management, including data cleaning and preparation, merging and splitting data sets, and transforming variables. SPSS allows researchers to customize analyses and create custom functions for specific research needs. SPSS produces easy-to-read output and can create clear and concise visualizations such as graphs and charts.

SPSS can be expensive to purchase or use, particularly for small research projects or individual researchers. Although SPSS has an easy-to-use interface, there is still a learning curve to mastering the software and understanding statistical concepts. While SPSS offers a wide range of statistical analyses, it may not be the best option for complex or specialized research projects. SPSS uses a proprietary programming language, which may limit researchers' ability to customize analyses and functions. SPSS may not be compatible with other software programs or operating systems, which could create issues when sharing data or collaborating with other researchers.

Benefits and challenges of using application software in educational research

Based on the experience of the researcher, the following benefits and challenges of using application software in educational research were summarised:

Application software can improve the accuracy and efficiency of educational research in a number of ways, including:

1. Standardizing data collection: Application software can provide standardized data collection forms, checklists, and templates that ensure consistent data collection across different users and sites. This can help to minimize errors and discrepancies in data collection.

2. Real-time data validation: Application software can validate data in real-time, providing immediate feedback to users if data is missing, incomplete, or inconsistent. This can help to prevent errors and improve data accuracy.

3. Data preparation: Application software can automate data preparation tasks such as data cleaning, data transformation, and data formatting. This can save time and effort compared to manual data preparation, and reduce the risk of errors.

4. Statistical analysis: Application software can provide built-in statistical analysis tools that enable users to perform a wide range of statistical tests and analyses on their data. These tools can help users identify relationships, correlations, and causal effects in the data.

5. Automation: Application software can automate repetitive or time-consuming tasks, such as running statistical analyses or generating reports. This can save time and improve efficiency by allowing users to focus on more complex tasks.

6. Collaboration: Application software can facilitate collaboration between team members by enabling real-time sharing and collaboration on data analysis projects. This can help to improve communication and streamline the analysis process.

7. Integration with other tools: Application software can integrate with other tools, such as Microsoft Office, to enable users to easily import and export data and presentation materials.

While application software can be a valuable tool in the educational research process, there are several challenges that researchers may face when using it. Some of these challenges include:

1. Learning curve: Depending on the complexity of the software, there may be a steep learning curve for researchers who are not familiar with the application. This can lead to frustration and decreased efficiency during the research process.

2. Compatibility issues: Application software may not be compatible with all operating systems or hardware configurations, which can make it difficult for researchers to access and use the software.

3. Data security: Researchers must ensure that the application software they use is secure and protects the privacy of research participants. This may involve implementing security measures such as encryption, firewalls, and access controls.

4. Cost: Depending on the software, there may be significant costs associated with purchasing or licensing the application, which may be a barrier for researchers who have limited funding.

5. Lack of flexibility: Application software is designed to perform specific functions and may not be flexible enough to accommodate the unique needs of all research projects. Researchers may need to make compromises or workarounds to adapt the software to their specific needs.

6. Lack of transparency: Some application software may be proprietary or closed-source, which can limit researchers' ability to understand how the software works and assess its accuracy and reliability.

7. Ethical considerations: The use of application software in educational research may raise ethical concerns related to privacy, consent, and data security. Researchers must be aware of these concerns and take steps to protect the rights of research participants.

Conclusion

In conclusion, application software plays a crucial role in enhancing the efficiency and accuracy of educational research. Writing tools such as Microsoft Word, writing enhancement software like Grammarly and Quillbot, and reference management software like Zotero are some of the software that researchers can use to improve the quality and clarity of their research writing, save time, and avoid errors. Academic search engines and databases like Google Scholar, JSTOR, and Shodhganga can help researchers conduct a literature review quickly and efficiently. Google Forms and Excel are accessible and user-friendly tools for data collection and analysis but have limitations in terms of data privacy and handling large datasets. SPSS is a widely used statistical package with a variety of analysis options but can be expensive and require some level of statistical knowledge.

The use of application software in educational research can provide numerous benefits, such as standardized data collection, real-time data validation, automation, and collaboration. However, researchers must also consider the challenges associated with the use of such software, such as the learning curve, compatibility issues, data security, cost, lack of flexibility, lack of transparency, and ethical considerations. Despite these challenges, application software remains a powerful tool for educational research that can improve the accuracy, efficiency, and effectiveness of the research process. It is important for researchers to carefully evaluate the benefits and challenges of using application software and choose the right software for their specific research needs.

Looking towards the future, the continued development of application software is likely to have significant implications for educational research. As technology continues to evolve, new software options are likely to emerge, providing researchers with even more powerful tools for data collection, analysis, and presentation. However, researchers must remain vigilant in ensuring that these tools are used in an ethical and responsible manner, with careful attention to the needs and well-being of research participants. By doing so, application software can continue to play a critical role in advancing our understanding of education and learning.

References

1. Application software. (2023, April 6). In *Wikipedia*. https://en.wikipedia.org/wiki/Application_software
2. Britannica, T. Editors of Encyclopaedia (2022, August 31). technology. Encyclopedia Britannica. https://www.britannica.com/technology/technology
3. Educational research. (2023, February 19). In *Wikipedia*. https://en.wikipedia.org/wiki/Educational_research
4. Global Community. (2023). Zotero (Version 6.0.26). Retrieved from https://www.zotero.org/
5. Google LLC. (2023). Forms. Retrieved from https://docs.google.com/forms/u/0/
6. Google LLC. (2023). Google Scholar. Retrieved from https://scholar.google.com/
7. Grammarly Inc. (2023). Grammarly (v1.0.29.469). Retrieved from https://app.grammarly.com/apps
8. IBM Corp. (2021). IBM SPSS Statistics for Windows (Version 28.0) [Computer software]. Armonk, NY: IBM Corp.

9. Inflibnet. (2023). Shodhganga. Retrieved from https://shodhganga.inflibnet.ac.in/

10. Ithaka. (2023). JSTOR. Retrieved from https://www.jstor.org/

11. Microsoft Corporation. (2023). *Microsoft Excel*. Retrieved from https://www.microsoft.com/en-us/microsoft-365/excel

12. Microsoft Corporation. (2023). *Microsoft Word*. Retrieved from https://www.microsoft.com/en-in/microsoft-365/word

13. QuillBot Inc. (2023). QuillBot (v14.96.2). Retrieved from https://quillbot.com/

14. Technology. (2023, March 25). In *Wikipedia*. https://en.wikipedia.org/wiki/Technology