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# Needs Analysis for the Development of Intelligent Wheelchair Assistant Technology to be Integrated into Hybrid Classes for Students with Disabilities

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**Abstract**

This study aims to analyze students' needs for the development of intelligent wheelchair assistant technology to be integrated into hybrid classes for students with disabilities. This research is motivated by the importance of creating a foundation for developing more inclusive and effective technology in the world of education. The use of intelligent wheelchair assistant technology is expected to improve the learning experience of students with disabilities and enable more equitable and inclusive education. The research is part of quantitative research conducted in March 2024. The population in this study consisted of 124 students from several universities. The instrument used in this study was a needs analysis questionnaire sheet consisting of 19 statements with answer choices following the Likert scale guidelines. The results of the needs questionnaire analysis showed that students needed the development of intelligent wheelchair assistant technology to be integrated into hybrid classes for students with disabilities as evidenced by the results of the needs analysis questionnaire of 81.39% in the strongly agree category.

## A. Introduction

Technological advances in the modern era, education has undergone major changes. These changes not only affect the way we learn, but also provide new challenges and new opportunities for the education process (Hasnida et al., 2024). One of the technological advances is the use of technology to support inclusive education for people with disabilities or special needs (Azizah & Hendriyani, 2024).

UNESCO coined the term "inclusive education", meaning "education friendly to all", with an educational approach that seeks to reach everyone without exception (Meka et al., 2023). The aim of this inclusive approach is to ensure that everyone, including those with special needs, has full access to quality education (Fionita & Nurjannah, 2024).

In this modern era, learning is not only limited to the physical boundaries of the classroom, but learning can now be done virtually through online learning platforms (Siringoringo & Alfaridzi, 2024). One of them is hybrid learning, hybrid learning is a learning method that combines online and face-to-face learning regularly and effectively (Gultom et al., 2022). However, this learning model has its own challenges for students with disabilities to actively participate (Muhibbin & Hendriani, 2021). In this context, one of the technologies that students with disabilities can use to improve accessibility in hybrid learning is assistive technology such as smart wheelchairs (Aziz et al., 2024). Smart wheelchairs are assistive devices used by

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people with physical disabilities. Smart wheelchairs are made using the latest technologies that can make it easier for users (Purwadani et al., 2022).

Smart wheelchairs are made for different types of users (Winjaya & Darmawan, 2020). Smart wheelchairs are the result of a combination of artificial intelligence (AI) technology and hardware such as cameras, sensors, and automatic navigation systems (Wicaksana et al., 2023). This opens up great opportunities for students with disabilities to fully participate in learning both physically and virtually (Cojocaru et al., 2022). These smart wheelchairs can become easier to use and more responsive to user needs thanks to advances in the Internet of Things (IoT) and artificial intelligence (AI) (Lu et al., 2021).

In developing and incorporating this technology into the educational environment, a comprehensive needs analysis is needed to understand the needs of students with disabilities, especially students who use wheelchairs, in order to optimally participate in hybrid classes. Therefore, this article focuses on the analysis of the development of intelligent wheelchair assistant technology that can be integrated into a hybrid learning environment. by looking at the needs of students with disabilities, the problems they face, and how intelligent wheelchair technology can help them overcome these problems.

Based on the description of the importance of creating a foundation for developing more inclusive and effective technology in the world of education, a needs analysis was conducted on the development of intelligent wheelchair assistant technology to be integrated into hybrid classes for students with disabilities. Thus, the use of this technology is expected to improve the learning experience of students with disabilities and enable more equitable and inclusive education.

## B. Research Methods

The research is part of a quantitative research conducted in March 2024. The population in this study were students from several universities. The purpose of this study is to create a basis for developing more inclusive and effective technology in the world of education through needs analysis. Thus, the use of this technology is expected to improve the learning experience of students with disabilities and enable more equitable and inclusive education.

The instrument used in this study was a needs analysis questionnaire sheet consisting of 19 statements with answer choices following the Likert scale guidelines.as in table 1 below:

**Table 1**. Likert Scale Calculation (Kartika et al., 2024)

| Evaluation | Scale Value |
|---|---|
| Strongly agree | 4 |
| Agree | 3 |
| Don't agree | 2 |
| Strongly Disagree | 1 |

The data analysis technique used is descriptive statistical analysis. The instrument items distributed are given quantitative values based on the Likert model, the interpretation of the scores can be seen in table 2 below.

**Table 2**. Interpretation of Likert Scale (Purwanto & Risdianto, 2022)

| Percentage (%) | Category |
|---|---|
| 0 % - 25 % | Strongly Disagree |
| 26% - 50% | Don't agree |
| 51% - 75% | Agree |
| 76% - 100% | Strongly agree |

## C. Results and Discussion

Based on the results of distributing the needs analysis questionnaire on the development of intelligent wheelchair assistant technology to be integrated into hybrid classes for students with disabilities with a total of 19 statement items and filled in by 124 respondents (students). The results were obtained as in table 3.

**Table 3**. Results of Questionnaire Distribution

| Statement item(P) | Percentage | Category |
|---|---|---|
| P-1 | 85.69% | Strongly agree |

| Statement item(P) | Percentage | Category |
|---|---|---|
| P-2 | 86.09% | Strongly agree |
| P-3 | 81.05% | Strongly agree |
| P-4 | 81.05% | Strongly agree |
| P-5 | 81.45% | Strongly agree |
| P-6 | 77.42% | Strongly agree |
| P-7 | 82.26% | Strongly agree |
| P-8 | 78.02% | Strongly agree |
| P-9 | 81.85% | Strongly agree |
| P-10 | 80.65% | Strongly agree |
| P-11 | 82.06% | Strongly agree |
| P-12 | 80.44% | Strongly agree |
| P-13 | 82.86% | Strongly agree |
| P-14 | 81.25% | Strongly agree |
| P-15 | 80.65% | Strongly agree |
| P-16 | 79.64% | Strongly agree |
| P-17 | 81.05% | Strongly agree |
| P-18 | 80.85% | Strongly agree |
| P-19 | 82.06% | Strongly agree |
| **Total** | **81.39%** | **Strongly agree** |

Based on the research results in table 3. The overall percentage obtained from the distribution of questionnaires filled out by 124 respondents (students) obtained a result of 81.39% with a category of strongly agree. This states that respondents want smart technology that can support learning in hybrid classes. Respondents support the development of technology that can improve the learning experience for people with disabilities. Respondents stated that the development of smart wheelchair technology can increase the independence of people with disabilities in participating in hybrid class activities. In addition, respondents want technology that can help people with disabilities overcome daily challenges in hybrid classrooms.

The results of the analysis show that intelligent wheelchair assistant technology has great potential to increase the independence and participation of students with disabilities in hybrid classes. With the development of this technology, it is hoped that students with disabilities can be more active in participating in the teaching and learning process through better access to the campus environment and ease of interaction with online learning platforms. This can also help reduce psychological difficulties that may be caused by dependence on others or physical limitations. This hybrid intelligent wheelchair is an innovative step that has the potential to increase inclusion in higher education environments. This technology can help students with disabilities get a more equal and fair education.

## D. Conclusion

Respondents (students) from several universities need the development of intelligent wheelchair assistant technology to be integrated into hybrid classes for students with disabilities, as evidenced by the results of the needs analysis questionnaire of 81.39% in the category of strongly agreeing with statements that indicate needs.

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## References

Aziz, M., Mubarok, N., & Anam, K. (2024). Monitoring daya pada kursi roda cerdas 1. *Journal of Mechanical Engineering. Electrical Engineering. Information Systems, Industrial Engineering, and Textile*, *9*(April), 68–78. https://doi.org/10.52561/teknika.v9i1.321

Azizah, N., & Hendriyani, W. (2024). Implementasi Penggunaan Teknologi Digital sebagai Media Pembelajaran Pada Pendidikan Inklusi di Indonesia. *Education*, *10*(2), 644–651. https://doi.org/10.31949/educatio.v10i2.8586

Cojocaru, D., Manta, L. F., Pană, C. F., Dragomir, A., Mariniuc, A. M., & Vladu, I. C. (2022). The Design of an Intelligent Robotic Wheelchair Supporting People with Special Needs, Including for Their Visual System. *Healthcare (Switzerland)*, *10*(1). https://doi.org/10.3390/healthcare10010013

Fionita, W., & Nurjannah, E. (2024). Implementasi Pendidikan Inklusif Sebagai Perubahan Paradigma Pendidikan Di Indonesia. *Jurnal Bintang Pendidikan Indonesia (JUBPI)*, *2*(2), 302–311. https://doi.org/10.55606/jubpi.v2i2.2968

Gultom, J. R., Sundara, D., & Fatwara, M. D. (2022). Pembelajaran Hybrid Learning Model Sebagai Strategi Optimalisasi Sistem Pembelajaran Di Era Pandemi Covid-19 Pada Perguruan Tinggi Di Jakarta. *Mediastima*, *28*(1), 11–22. https://doi.org/10.55122/mediastima.v28i1.385

Hasnida, S. S., Adrian, R., & Siagian, N. A. (2024). Transformasi Pendidikan di Era Digital. *Jurnal Bintang Pendidikan Indonesia (JUBPI)*, *2*(1), 110–116. https://doi.org/10.55606/jubpi.v2i1.2488

Kartika, H. A., Purwanto, A., & Risdianto, Ek. (2024). Development of Physics E-Books Assisted by Flipbook and Augmented Reality (AR) to Increase Learning Motivation of High School Students. *Asian Journal of Science Education*, *6*(1), 70–81. https://doi.org/10.24815/ajse.v6i1.36294

Lu, C. Y., Tseng, C. L., Horng, W. Y., Chiu, Y. S., Tai, C. C., & Su, T. J. (2021). Applying internet of things to data monitoring of powered wheelchairs. *Sensors and Materials*, *33*(6), 1869–1881. https://doi.org/10.18494/SAM.2021.3247

Meka, M., Dhoka, F. A., Poang, F., Dhey, K. A., & Lajo, M. Y. (2023). Pendidikan Inklusi Citra Bakti Permasalahan Sosial Anak Berkebutuhan Kusus. *Jurnal Pendidikan Inklusi*, *1*(1), 20–30. https://doi.org/10.38048/jpicb.v1i1.2109

Muhibbin, M. A., & Hendriani, W. (2021). Tantangan Dan Strategi Pendidikan Inklusi di Perguruan Tinggi di Indonesia: Literature Review. *JPI (Jurnal Pendidikan Inklusi)*, *4*(2), 92. https://doi.org/10.26740/inklusi.v4n2.p92-102

Purwadani, B. A., Sofyan, I., Putri, F., Mallisa, P., Ghaisyani, O., & Pramono, N. A. (2022). Prototype Kursi Roda Cerdas Berbasis Raspberry Pi dan Sistem Kendali Android, Speech Recognition, Touch, dan Gesture Control. *Jurnal MIPA Dan Pembelajarannya*, *2*(4), 276–281. https://doi.org/10.17977/um067v2i3p276-281

Purwanto, A., & Risdianto, E. (2022). Analisis Kebutuhan Pengembangan Bahan Ajar Digital Matakuliah Geofisika Berbasis Platform Lms Moodle Untuk Menunjang Implementasi Kurikulum Mbkm. *Jurnal Kumparan Fisika*, *5*(1), 7–14. https://doi.org/10.33369/jkf.5.1.7-14

Siringoringo, R. G., & Alfaridzi, M. Y. (2024). Pengaruh Integrasi Teknologi Pembelajaran terhadap Efektivitas dan Transformasi Paradigma Pendidikan Era Digital. *Jurnal Yudistira: Publikasi Riset Ilmu Pendidikan Dan Bahasa*, *2*(3), 66–76. https://doi.org/10.61132/yudistira.v2i3.854

Wicaksana, S. U., Rohmayani, V., Hakim, L., & Setiyawan, R. (2023). Pengembangan Produk Inovasi BIMA Tuktuk bagi Mahasiswa Disabilitas di UMSurabaya. *Aksiologiya: Jurnal Pengabdian Kepada Masyarakat*, *7*(1). https://doi.org/10.30651/aks.v7i1.15374

Winjaya, F., & Darmawan, A. (2020). Perancangan Prototipe Kursi Roda Naik Tangga Pada Stasiun Sebagai Alat Bantu Orang Berkebutuhan Khusus. *Jurnal Perkeretaapian Indonesia*, *4*(2), 99–104. https://doi.org/10.37367/jpi.v4i2.88