Journal of ICSAR
ISSN (print): 2548-8619; ISSN (online): 2548-8600
Volume 5 Number 1 January 2021: 38-41

Developing Expert System Application to Identify Specific Children Learning Disabilities in Inclusion Schools

Supriyadi , Dian Atnantomi Wiliyanto

Universitas Sebelas Maret, Surakarta, Indonesia
E-mail: supriyadi@staff.uns.ac.id

Abstract: This study aims to develop an expert system application for the identification of specific children learning disabilities in Inclusion School. The research method used is development research design (R & D) to test the effectiveness of the use of identification of specific children learning disabilities with expert system application. Application testing was involving 40 teachers in inclusion schools to test expert system applications in identification. Validate results by teachers in inclusion schools were obtained that from aspects of system display, user, accuracy, and system responsibility have an average of 4.20 fall into the category of excellent. Expert system application development has several features, among others; home menu, analysis, and intervention to follow up learning services, learning media, and classroom embedding for specific children learning disabilities.
Keywords: Expert system, learning disabilities, inclusion Schools

INTRODUCTION

Inclusion Education is an education system that provides space for Children with Special Needs to be able to attend school with regular learners in one class. Schools that implement inclusion education provide special services and attention to Children with special needs to be able to process education regularly (Agustin, 2019).

Children with Special Needs who have different characteristics - different from various uniqueness (Hallahan, et al., 2020; Rapisa, 2018). The characteristics of children with diverse special needs cause teachers to become more likely to identify (Rapisa, 2018). Master's understanding of poor identification leads to errors in providing learning services to Children with Special Needs. This causes the lag of Children with Special Needs with other regular learners.

Specific children learning disabilities become the most difficult to identify because by birth it is not visible (Raharjo and Ahyani, 2011). Learning disabilities have small differences in physical and mental aspects compared to regular children, thus causing difficulty in carrying out proper identification (Cavendish, 2013; Russell et al., 2017). This problem is becoming increasingly crucial in inclusion schools, where analysis of teacher identification understanding in inclusion schools shows that under-understanding teachers are 37%, incomprehensible (23%), and lack of understanding (18%) (Wiliyanto, 2017a). This is influenced by most of the teachers not from Outstanding Education graduates. This is based on data from Special Assistance Teachers in Surakarta, 65% of teachers are not graduates of Special Education and 35% of Special Education graduates.

With resources in schools that cause problems in identifying, especially in children with specific learning disabilities whose symptoms or characteristics are very difficult to detect. Late identification of children with learning disabilities will lead to child lags in cognitive and social development (Mensah & Badu-Shayar, 2016). This causes the inclusion school work program needs improvement or cooperation with various parties so that education services by the needs of children according to the identification results (Mapunda et al., 2017).

The era of industry 4.0 has an impact on digitization in various fields, including the development of applications for identification (Cheng et al., 2020). During the covid 19 pandemics, digital-based identification is increasingly needed. Also, factors to make it easier for teachers who have difficulty in identifying specific children learning disabilities are required identification applications that are easily accessible to all teachers (Wiliyanto, 2017b). The use of expert system application provides an algorithm to solve problems based on symptoms or characteristics that appear so that it can be concluded a problem that wants to be detected (Al Hakim et al., 2020; Wiliyanto, 2017b).

The advantages of the expert system can be used as the basis for its use in the identification of specific children learning disabilities that have characteristics that are difficult to detect so that applications are needed that can give decisions in a structured and based on the symptoms that appear.

Table 1. Feasibility criteria

Criteria	Skor
Very good	4,00 – 5,00
Good	3,00 – 3,99
Not good enough	2,00 – 2,99
Not good	1,00 – 1,99

Table 2. Feasibility of expert system application

Assessment Aspects	Skor
System view	5
User	4,20
Accuracy	3,75
Responsibility system	4
Average	4,20 (Very good)

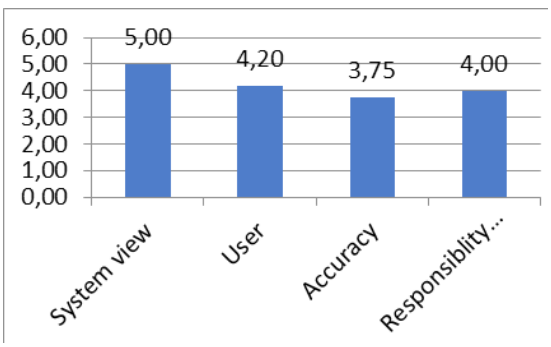

Figure 1. Expert system application feasibility diagram

This provides accuracy in child identification including learning disabilities or not, which will be a reference for learning programs, learning media, and placement of children following the identification results of the expert system application (Wiliyanto, 2017b).

METHOD

Research using development research design (R &D). The stages of development are divided into three stages, namely the stage of needs analysis, design, and testing. At the stage of needs, analysis is carried out a needs survey on identification. At the design stage of the design of the tree the decision to conclude the symptoms that arise at the time of identification of specific children learning disabilities.

Data collection using questionnaires with a Linkert scale to find out the feasibility of expert system application developed, table 1.

The test involves teachers in an inclusion school of 40 teachers as validators to test the feasibility of expert system applications.

FINDING AND DISCUSSION

The results of the study conducted by testing expert system application for identification of children-specific learning disabilities with teacher validators in inclusive schools were obtained the following results, table 2.

In table 2 showed validate results by teachers in inclusion schools obtained that from aspects of system display, user, accuracy, and system responsibility have an average of 4.20 fall into the category of very good.

Expert system application display developed based on the needs in the field by the analysis of the needs obtained application display that has three main menus, figure 1.

Home, This menu displays the face of the expert system application which contains how the application works and information about children learning disabilities through video, such as the following;

Analysis of Menu, This menu is the main menu used to identify children with specific learning disabilities. This display contains symptoms or characteristics that appear in children who are suspected of learning disabilities.

*Intervention Menu***,** This intervention menu is the result of an analysis that has been done on the previous menu. This menu described learning services, media defense, and class placement for specific children learning disabilities by the identification results.

Validation results are done with an average of 4.20 with excellent criteria. The use of an expert system or expert system is one that can be used by teachers to determine the right identification and intervention for children with special needs. In the study using the help of a decision support system application can be used to identify motor disorders. An expert system is a computer-based system that uses knowledge, facts, and reasoning techniques in solving problems that can usually only be solved by expert systems in certain fields that can give a decision about a problem experienced (Al Hakim et al., 2020). The advantages of using expert systems or expert systems in the world of education, among others, to solve learning problems of learners, to provide interventions that are by the problems experienced by learners (Goodarzi & Rafe, 2012). Determination of identification and level of intelligence and interests and classes by the ability of learners can be done by expert systems or expert systems sourced from databases (Nugraha & Herlawati, 2016).

Expert system to help the development of education and help students and teachers in learning in the classroom (Sora & Sora, 2014). In-class learning the expert system can play a role in solving learning problems that are considered difficult such as mathematics and science for students in the school

(Salekhova et al., 2013). In education children with special needs, a web-based expert system is used to facilitate deaf children in accessing learning in the classroom (Elgaml & Baladoh, 2014).

Class determination for newly entered learners can be done with an expert system application, where the system provides class recommendations and learning plans suitable for learners by their intellectual condition (Al-Ghamdi., 2012; Bouaiachi et al., 2014). Another research expert system is a system that can be used to provide recommendations on academic plans about learning options that are by the conditions of learners (Ayman, 2011). Expert systems can provide an overview of the interests and IQ of learners. Characteristics of learners identified, an expert system for training recommendations by the educational history stored in the database that is useful in overcoming learning problems experienced by learners (Daramola et al., 2014). The use of web-based applications determines recommendations for lesson schedule decisions and the level of completeness and provides training or intervention recommendations that are by the intellectual condition of the learner. Curriculum determination that suits the condition of learners can use web-based applications that provide accurate decisions (Lightfoot, 2014). The assessment process or assessment of web-based expert systems can play a role in evaluating the learning outcomes of learners who have been developed or planned.

The use of expert system application can be used as a diagnosis of learners' learning problems such as writing, reading, counting, and socialization problems (Hustinawaty & Aprianggi, 2014). Decisions resulting from the analysis of expert system applications are adjusted to the real circumstances based on the condition of the learners and provide an overview of behavior and cognition (Alfiah et al., 2019). The equation of using the expert system application for teachers in schools is to know the problems experienced by students and determine the right services according to their needs. The difference from the research developed with the use of expert system application is used to identify specific children learning disabilities that explain the barriers (categories) of children with special needs and provide recommendations for handling by the needs of learners. Recommendations for handling according to the analysis of children with special needs include class placement, learning media, and evaluation.

CONCLUSION

Conclusions based on the test results of expert system applications developed for the identification of specific children learning disabilities are with excellent categories. The results of the development resulted in the appearance of the application menu are consisting of three main menus, namely; home menu, analysis, and intervention. The application provides convenience to teachers in inclusion schools to determine learning services, learning media, and placements that are by the abilities and needs of specific children learning disabilities that are identified with the expert system application.

REFERENCES

Agustin, I. (2019). Permasalahan dalam Penyelenggaraan Pendidikan Inklusi di SDN Se Kecamatan Soko Kabupaten Tuban. *ELSE (Elementary School Education Journal): Jurnal Pendidikan dan Pembelajaran Sekolah Dasar, 3*(2), 17-26.

Al-Ghamdi, A. (2012). An Expert System for Advising Postgraduate Students. *Ijcsit*, *3*(3), 4529–4532.

Al Hakim, R. R., Rusdi, E., & Setiawan, M. A. (2020). Android Based Expert System Application for Diagnose COVID-19 Disease : Cases Study of Banyumas Regency. *Journal of Intelligent Computing & Health Informatics*, *1*(2), 1–13. https://doi.org/https://doi.org/10.26714/jichi.v1i2.5958

Alfiah, F., Adnandi, M. A., & ... (2019). Expert System To Identify Students Behavior and Personality in Smk Negeri 2 Tangerang. *Jurnal Techno Nusa ...*, *16*(2), 85–92. http://ejournal.nusamandiri.ac.id/index.php/techno/article/view/379

Ayman, M. (2011). A Prototype Student Advising Expert System Supported with an Object-Oriented Database. *International Journal of Advanced Computer Science and Applications*, *1*(3), 100–105. https://doi.org/10.14569/specialissue.2011.010316

Bouaiachi, Y., Khaldi, M., & Azmani, A. (2014). A Prototype Expert System for Academic Orientation and Student Major Selection. *International Journal of Scientific & Engineering Research*, *5*(11), 25–28.

Cavendish, W. (2013). Identification of learning disabilities: Implications of proposed DSM-5 criteria for school-based assessment. *Journal of learning disabilities, 46(*1), 52-57.

Cheng, G. J., Liu, L. T., Qiang, X. J., & Liu, Y. (2016, June). Industry 4.0 development and application of intelligent manufacturing. In *2016 international conference on information system and artificial intelligence (ISAI)* (pp. 407-410). IEEE.

Daramola, O., Emebo, O., Afolabi, I., & Ayo, C. (2014). Implementation of an Intelligent Course Advisory Expert System. *International Journal of Advanced Research in Artificial Intelligence*, *3*(5), 6–12. https://doi.org/10.14569/ijarai.2014.030502

Elgaml, A. F., & Baladoh, S. M. (2014). *An Intelligent Web-based System to Enhance Digital Circuits Concepts and Skills for Deaf Students*. *4*(2).

Goodarzi, M. H., & Rafe, V. (2012). Educational Advisor System Implemented by Web-Based Fuzzy Expert Systems. *Journal of Software Engineering and Applications*, *05*(07), 500–507. https://doi.org/10.4236/jsea.2012.57058

Hallahan, D. P., Pullen, P. C., Kauffman, J. M., & Badar, J. (2020). Exceptional learners. In *Oxford Research Encyclopedia of Education.*

Hustinawaty, & Aprianggi, R. (2014). The Development of Web-Based Expert System for Diagnosing Children Diseases Using PHP and MySQL. *International Journal of Computer Trends and Technology*, *10*(4), 197–202. https://doi.org/10.14445/22312803/ijctt-v10p134

Lightfoot, J. M. (2014). A Web-Based Knowledge Management Tool Utilizing Concept Maps for On-Line Student Advising. *Journal of International Technology & Information Management*, *23*(1), 41–56. https://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=108748087&site=ehost-live

Mapunda, P. H., Omollo, A. D., & Bali, T. A. (2017). Challenges in identifying and serving students with special needs in Dodoma, Tanzania. *International Journal of Child Care and Education Policy, 11*(1), 1-16.

Mensah, F. A., & Badu-Shayar, J. (2016). Identification of Special Educational Needs for Early Childhood Inclusive Education in Ghana. *Journal of Education and Practice, 7*(11), 1-8.

Nugraha, I. C., & Herlawati. (2016). Sistem Pakar Tes Minat Dan Bakat Jurusan Kuliah Berbasis Android Pada Sma Islam Teratai Putih Global Bekasi. *Jurnal Teknik Komputer AMIK BSI*, *2*(21), 138–147. http://www.e-jurnal.com/2016/09/sistem-pakar-tes-minat-dan-bakat.html

Raharjo, T., & Ahyani, L. N. (2011). Identifikasi Kesulitan Belajar pada Anak Pendidikan Usia Dini. *Sosial dan Budaya, 4*(1), 1-9.

Rapisa, D. R. (2018). Kemampuan Guru dalam Melakukan Identifikasi Anak Berkebutuhan Khusus. Pedagogia. *Jurnal Ilmu Pendidikan, 16* (1), 15-24.

Russell, A. M., Bryant, L., & House, A. (2017). Identifying people with a learning disability: an advanced search for general practice. *British Journal of General Practice, 67*(665), e842-e850.

Salekhova, L., Nurgaliev, A., Zaripova, R., & Khakimullina, N. (2013). The Principles of Designing a Gamification System in Teaching Mathematics. *Universal Journal of Educational Research*, *1*(2), 42–47. https://doi.org/10.13189/ujer.2013.010202

Sora, J.C., Sora, S. A. (2014). Using Appropriate E-learning Systems to Optimize Teaching and Learning. *GSTF Journal on Computing (JoC)*, *2*(3), 47–52. https://doi.org/10.5176/2010-3043

Wiliyanto, D. A. (2017). The Use of Web Based Expert System Application for Identification and Intervention of Children with Special Needs in Inclusive School. *Journal of Education and Learning, 11*(4), 460-467.

Wiliyanto, D. A. (2017). Analysis of Teachers' Understanding Level, Needs, and Difficulties in Identifying Children with Special Needs in Inclusve School in Surakarta. *Journal of Education and Learning, 11*(4), 352-357.