

## Automaed Short Esai Scoring (ASES): Sebuah Solusi Potensial Untuk Model Penilaian Kurikulum Kebencanaan dalam Sistem Pembelajaran Online

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### Abstrak.

Kondisi geografis Kota Medan yang rawan banjir menuntut kesiapan berbagai pihak untuk mengatasinya. Salah satu cara mengantisipasi agar masyarakat selalu siaga bencana adalah dengan mengembangkan kurikulum kebencanaan. Berdasarkan kondisi tersebut, penelitian ini dilatarbelakangi oleh pentingnya model penilaian Automated Short Essay Scoring (ASES) sebagai model penilaian kurikulum Kebencanaan. Tujuan dari penelitian ini adalah untuk mengembangkan model penilaian ASES sebagai model penilaian pada kurikulum kebencanaan dalam pembelajaran online. Metode analisis dalam penelitian ini adalah Research and Development (R&D) yang menggunakan pendekatan campuran (*mixed methode*). Penelitian ini mengembangkan perangkat lunak dengan tahapan: (1) analisis kebutuhan dan (2) desain model penilaian, (3) validasi ahli, (4) revisi produk, dan (5) implementasi. Hasil penelitian dapat dikemukakan sebagai berikut: (1) pengembangan model asesmen ASES sebagai model penilaian pada kurikulum kebencanaan dalam sistem pembelajaran online telah memberikan solusi dalam kegiatan pembelajaran online. Kegiatan penelitian ini diawali dengan studi pendahuluan berupa analisis kebutuhan; (2) Pada tahap desain penulisan program untuk menghasilkan produk prototipe awal, (3) tahap validasi ahli; dan (4) hasil validasi model penilaian ASES pada aspek isi instrumen memperoleh skor 4,69 (kategori sangat baik), aspek virtual memperoleh skor 4,29 (kategori baik), dan aspek pemrograman memperoleh skor sebesar 4,63 (kategori sangat baik).

**Kata kunci:** ASES, Kurikulum Kebencanaan, Pembelajaran Online

### *Automated Short Essay Scoring: A Potential Solution for Disasters Curriculum Assessment Model in The Online Learning System*

#### Abstract

*The geographical condition of Medan City which is prone to flooding requires the readiness of various parties to overcome it. One way to anticipate that the community is always prepared for disasters is to develop a disaster curriculum. Based on these conditions, this research is motivated by the importance of the Automated Short Essay Scoring (ASES) assessment model as a model for assessing the Disaster Curriculum. The purpose of this research is to develop an ASES assessment model as an assessment model in the disaster curriculum in online learning. The analytical method in this study is Research and Development (R&D) which uses a mixed approach. This research develops software with stages: (1) needs analysis and (2) assessment model design, (3) expert validation, (4) product revision, and (5) implementation. The results of the research can be stated as follows: (1) the development of the ASES assessment model as an assessment model in the disaster curriculum in the online learning system has provided solutions in online learning activities. This research activity begins with a preliminary study in the form of needs analysis; (2) At the design stage of writing a program to produce an initial prototype product, (3) at the expert validation stage; and (4) results of the validation of the ASES assessment model on the content aspect of the instrument obtaining a score of 4.69 (very good category), the virtual aspect obtaining a score of 4.29 (good category), and the programming aspect obtaining a score of 4.63 (very good category).*

**Keywords:** ASES, Disaster Curriculum, Online Learning.

## 1. PENDAHULUAN

Indonesia has varying levels of natural disasters. Disasters that often occur include earthquakes, floods, forest fires, landslides, and other natural disasters. This is because Indonesia's geographical location is in the ring of fire, and is the country that has the most mountains. Indonesia is the country

passed by the Pacific plate from the East and Eurasia from the North, as well as Indo-Australia from the South [1]. The increase in natural disasters experienced by Indonesia is increasing as a result of global climate change and an uncontrolled increase in the number of people [2]. Social, economic, and demographic conditions in the Country of Indonesia have a major contribution to natural disasters that are vulnerable to society, as well as the minimal capacity of the community in overcoming the problem of natural disasters causing natural disaster risk factors in Indonesia to increase [3]. Low handling, community attention to disaster mitigation, as well as the role of schools in the introduction of disaster mitigation education is still very minimal applied to learners, causing awareness and ability of learners in responding to disasters is very weak [4]. The role of the school in increasing awareness and the ability of learners in the face of disasters is important so that the community does not experience panic. Disaster management has been stipulated in Law No. 24 of 2007 which was approved on April 26, 2007 by discussing the management of bencana from responsive perspective to preventive (disaster risk management). Disasters experienced by the community include potential losses in the form of death, illness, loss of security, injuries, damage or loss of property, evacuation, and disruption of community activities [5].

The potential for a major disaster to occur in Indonesia, it takes a rapid and responsive response in anticipating, preventing, and facing disasters. One of the important roles in increasing public awareness of disasters through the role of schools in education becomes the initial coaching for learners in fostering disaster response attitudes through providing understanding of disasters. School is the right means in providing initial knowledge, as well as fostering disaster response attitudes, to create disaster response behavior.

UNESCO and UNICEF (2012) conducted curriculum mapping in 30 countries in East Asia and Asia Pacific, East Africa and South Africa, Central and Eastern Europe as well as commonwealth countries, South Asia, Industrialized Countries, Latin America and the Caribbean, Central and West Africa, that the country has implemented Disaster Risk Reduction (PRB) in formal learning activities as well as in extracurricular learning activities. However, from the mapping obtained data that the experience of Disaster Risk Reduction (PRB) and learners are not connected to each other in several countries both in a structured and systematic manner on the official curriculum. There are 20 countries that integrate disaster risk reduction (PRB) in the subjects of Biology, Chemistry, Geology, Earth Studies and Physics. There are 11 countries that integrate on geography subjects, 10 countries integrate on language subjects (literature), as many as 5 countries integrate on subjects of civics education and citizenship, and 2 countries integrate on other subjects. The curriculum applied to the PRB does not yet include prevention, mitigation and preparedness in the face of disasters, as well as systematic disasters [6]. Disaster Risk Reduction (PRB) education activities are sustainable development activities that are expected so that disaster risk can be reduced and the introduction of PRBs can achieve broader goals from an early age to all learners and have a contribution to disaster preparedness [7]. PRB education was formed to create a resilient and disaster response society from an early age. The provision of disaster mitigation education conducted in schools includes the curriculum on disasters applied ranging from PAUD level to high school equivalent and conducting training (simulation) on an ongoing basis in increasing awareness and preparedness for disasters. This education is applied through programs that have been implemented in several schools, namely Disaster Alert Schools (SSB) by implementing assessment and planning processes, minimizing disruption, implementing physical protection strategies and increasing the capacity building of response from physical harm to students and school staff, and developing and preserving a culture of safety [8]. paradigm shift in public awareness through citizen disaster science education, which will provide basic science behind any disaster of their locality that help in taking decisions in reducing exposure, improving preparedness and reaction, response and recovery to any disaster [9].

From research conducted by Proulx & Aboud (2019) that from a research sample of 102 children who have attended preschool with disaster risk reduction program (intervention group) and 101 children who have attended preschool without disaster reduction program (comparison group) It was obtained that the researcher of the Disaster Risk Reduction program improved the quality of the preschool environment to knowledge about disaster risk reduction through the application of reading, writing, and various other learning activities. So that children increasingly understand and have a high awareness of the disasters that occur and know the application of disaster mitigation that can be done [10].

Online learning is the choice of learning model when a disaster or epidemic occurs. Every curriculum that is implemented in any learning model, including the disaster curriculum in the form of writing skills, must carry out an assessment, essay writing is a short literary composition on a certain topic or subject, usually in prose and generally analytic, speculative, or interpretive. Researchers consider essays as the most useful tool for assessing learning outcomes. Essays give students the opportunity to demonstrate their range of skills and knowledge, including higher order thinking, skills such as synthesis and analysis.

However, grading student essays is a time-consuming, labor-intensive and expensive activity for educational institutions. Since teachers are burdened with grading hours of written assignments, they give fewer essays, thereby limiting the experience needed to achieve writing goals.

This goes against the goal of making students better writers, for which they need to practice their skills by writing as much as possible. One method that can be used to evaluate student short essays automatically is the Automated Short Essay Scoring (ASES). ASES was developed from Automated Essay Scoring. Automated Essay Scoring is a computer program used to assess written work.

According to Ramesh (2021) Automated Essay Assessment (AES) is a computer-based assessment system that automatically assesses or grades student responses by considering the appropriate features automated essay evaluation procedure [11]. As the figure shows, most existing systems use a large set of prompt-specific essays (that is, a collection of essays on the same topic). The human expert rating rate this essay with a score for example from 1 to 6, to build a learning toolkit. This set is used to develop a scoring model of the AES system and align it. Using this scoring model, the AES system assigns a score to new, ungraded essays [12].

Automated Essay Scoring (AES) is the setting of a score for essays in the form of tasks automatically used as an alternative in conducting assessments. The automated essay assessment work system is simply developed from several carefully designed models in evaluating and assessing essays [13]. The same thing was stated by Liu, Xu, & Zhu, in his research that the Automated Essay Scoring (AES) method is effective in assessing essays by developing disaster mitigation knowledge in learners [14]. In educational assessment, there is an obvious role for the short answer item as a complement not only longer essay but also of the traditional selected response item. There are several main points related to Automated Essay Scoring according to the Brew & Leacock [15] namely:

- (1) Components of AES rely heavily on good specific analysis and human expertise in engineering knowledge.
- (2) Much of the work of an, automated scoring engine for essays can be done at the levels of spelling, grammar, and vocabulary, whereas an engine for short answers must address meaning as a primary concern.
- (3) From the assessment aspect, the test taking process is given the maximum opportunity to demonstrate their abilities, knowledge, and skills, but from the aspect of automatic assessment, the opportunity in explaining items is limited.

The performance of a rating model is usually validated by calculating how well the model's assessment "replicates" the scores assigned by human expert raters. Based on this background, the Automated Short Essay Scoring: A Potential Solution for Disasters Curriculum Assessment Model in The Online Learning System will be developed

## **2. METHODS**

This research is a Research and Development (R&D) type using a mixed methods research approach, which is a research approach that combines qualitative and quantitative research in one study. The use of this approach is based on considerations because the data collected in this study includes two types of data, namely quantitative and qualitative data [16]. The development of the ASES assessment model software as a disaster curriculum assessment model in the online learning system in this study was carried out using the Borg & Gall (2005) model with stages as: (1) needs analysis and (2) assessment model design, (3) expert validation., (4) product revision, and (5) implementation [17]. The procedure of this research is illustrated in Figure 1. below:

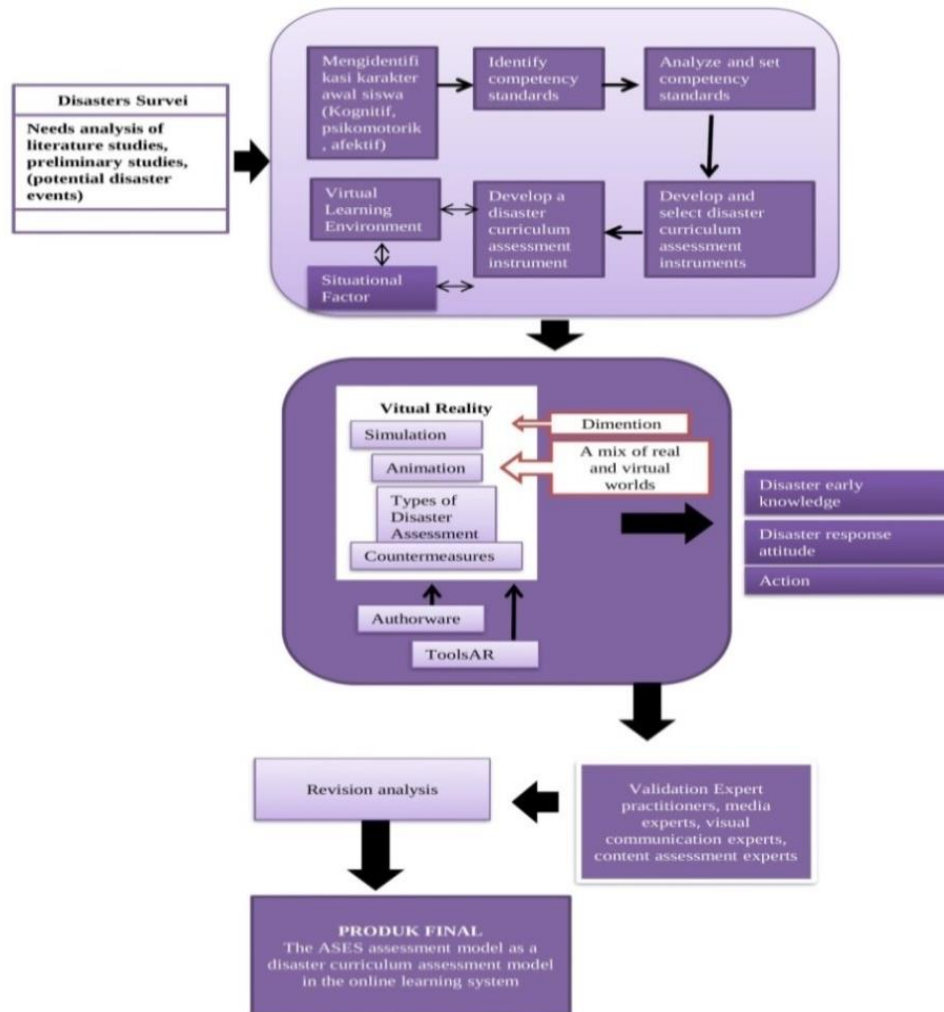


Figure 1. Reseach Procedure

The ASES assessment model as a disaster curriculum assessment model in the online learning system consists of several parts, namely video tutorials on using the ASES assessment model as a disaster curriculum assessment model in the online learning system, a collection of disaster questions consisting of floods, tsunami disasters, landslides, volcanic disasters, hurricanes. The ASES assessment model as a disaster curriculum assessment model in an online learning system that uses this software can be used by junior high school students. Software development is carried out using the assistance of the Computer Laboratory of the Faculty of Teacher Training and Education (FKIP) of the Islamic University of North Sumatra (UISU). The ASES assessment model as a disaster curriculum assessment model in this online learning system can be carried out on any computer that has the Macromedia Director program and other support programs.

The data analysis in this study used in this study is a quantitative and qualitative descriptive analysis that describes the results of the development of the ASES assessment model as a disaster curriculum assessment model in the online learning system, validator responses, test results from the model developed using expert judgment. Analysis of software and hardware is carried out by considering the minimum specifications, with reference to software development for learning media, namely efficiency and effectiveness, validity, reliability, accuracy of application selection, and product packaging.

### 3. RESULT and DISCUSSION

In the process of developing the ASES assessment model as a disaster curriculum assessment model in this online learning system, some software is needed to support disaster learning using online learning. The results of the development of the ASES assessment model as a disaster curriculum assessment model in the online learning system include 3 models, namely: (1) The conceptual model is the embodiment of conceptualizing the theories and principles behind the design of the ASES assessment

model as a disaster curriculum assessment model in the learning system online. The model that is used as the basis for developing the ASES assessment model is based on the model from Borg & Gall (2005) with an emphasis on research and development in general on online-based learning.

Furthermore, in the process of developing the ASES assessment model as a disaster curriculum assessment model in this online learning system, some software is needed to support the development of virtual-based disaster learning multimedia. The results of the development of this model include 3 forms of models, namely: (1) The conceptual model is the embodiment of the conceptualization of the theories and principles behind the design of the ASES assessment model as a disaster curriculum assessment model in the online learning system. (2) Procedural model, this model represents the stages of the ASES assessment model design as a disaster curriculum assessment model in the online learning system of learning to software design. The output of this procedural model produces a fiscal model in the form of an online-based disaster curriculum assessment program; (3) Fiscal Model; ASES assessment product as a disaster curriculum assessment model in an online learning system, a fiscal model in the physical form of computer-aided learning products.

This product is packaged in the form of a CD. This model produces flowcharts and story-boards as well as frame-by-frame designs. This step is the development of an ASES assessment model program or software as a disaster curriculum assessment model in an online learning system that is carried out using Macromedia Flash, as well as programming using 3-Dimensional graphic effects. Furthermore, the developed model is shown in Figure 2 below.

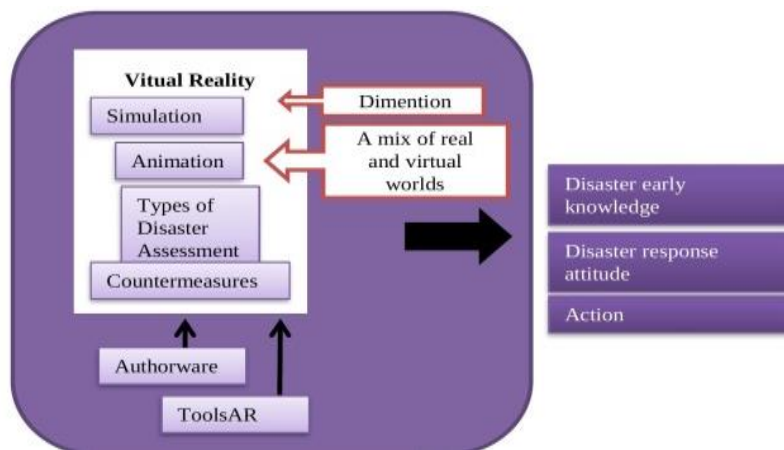


Figure 2. Steps Design on ASES Assessment Model

Furthermore, the content of the ASES assessment model facility was developed as a disaster curriculum assessment model in this online learning system, based on story boards and storyboard designs with the following menus: (1) Main Menu. The user interface in the ASES assessment model as a disaster curriculum assessment model in this online learning system is made as attractive as possible in order to attract the attention of students as users. The interface design for the Main Menu is described as follow:



Figure 3. Main Page of ASES Assessment Mode

Furthermore, validation of the ASES assessment model was carried out using several validator appraisers consisting of validators on the instrument content aspect, virtual aspect, and programming aspect. Based on the validation of the material experts on the content aspects of the assessment instrument in the very good category and concluded that the ASES assessment model as a disaster curriculum assessment model in the online learning system was worthy of further testing with some minor improvements. On the aspect of the content of the assessment instrument the results of expert validation of the content of the assessment instrument are shown in Table 1.

**Tabel 1.** Expert Validation Instruments for Assessment Materials on Content Aspects of ASES Assessment Instruments

| No             | Indicator                                 | Score | Conclusion |
|----------------|-------------------------------------------|-------|------------|
| 1              | Consistency Between Components in Design  | 4.63  | Very good  |
| 2              | Clarity of Purpose                        | 4.58  | Very good  |
| 3              | Instrumental Item Clarity                 | 4.75  | Very good  |
| 4              | Clarity of Cognitive Aspect Measurement   | 4.65  | Very good  |
| 5              | Clarity of Cognitive Aspect Measurement   | 4.82  | Very good  |
| 6              | Clarity of Psychomotor Aspect Measurement | 4.70  | Very good  |
| <b>Average</b> |                                           | 4.69  | Very good  |

Expert validation of the ASES assessment model as a disaster curriculum assessment model in the online learning system on the visual display aspect is in the good category and deserves to be tested further with some minor improvements. The results of the visual expert validation are shown in Table 2.

**Tabel 2.** Expert Validation Instruments on Visual Display of ASES Assessment Instruments

| No             | Indicator               | Score | Conclusion |
|----------------|-------------------------|-------|------------|
| 1              | Accuracy Text Selection | 4.00  | Good       |
| 2              | Language Usage          | 4.30  | Good       |
| 3              | Image Quality           | 4.25  | Good       |
| 4              | Color Accuracy          | 4.45  | Good       |
| 5              | Use of Music            | 4.30  | Good       |
| 6              | Layout                  | 4.47  | Good       |
| 7              | Animation               | 4.25  | Good       |
| 8              | Simulation              | 4.35  | Good       |
| 9              | Resolution              | 4.25  | Good       |
| <b>Average</b> |                         | 4.29  | Good       |

Expert validation of the ASES assessment model as a disaster curriculum assessment model in the online learning system in the programming aspect is in the very good category and deserves to be tested further with some minor improvements. The results of expert validation on programming aspects are shown in Table 3.

**Tabel 3.** Expert Validation Instruments on Programming Aspects ASSET Assessment Instruments

| No | Indicator                                                                                     | Score | Conclusion |
|----|-----------------------------------------------------------------------------------------------|-------|------------|
| 1  | Able to show the effects of disaster anaglyph                                                 | 4.55  | Very good  |
| 2  | The display of the disaster and learning components Anaglyph                                  | 4.60  | Very good  |
| 3  | Ease of understanding and remembering the content of the material through virtual explanation | 4.65  | Very good  |
| 4  | On the component visualization,                                                               | 4.65  | Very good  |

the simulation model is animated  
by using graphic techniques so  
that looks like reality

|                |                                |      |           |
|----------------|--------------------------------|------|-----------|
| <b>5</b>       | Provides navigation assistance | 4.70 | Very good |
| <b>Average</b> |                                | 4.63 | Very good |

After the expert validation has been carried out, revisions are carried out for later field trials. As stated in the previous section, a trial of the ASES assessment model as a disaster curriculum assessment model in an online learning system has been carried out at SMP N 23 Medan to see its effectiveness.

Referring to the research findings above, it can be seen that the ASES assessment model is very effectively used in the disaster curriculum in the online learning system. The findings of this study have implications for the importance of developing a disaster curriculum with assessment tools to anticipate all disaster problems that occur now and in the future. The ASES assessment model is a creative and innovative solution needed when a disaster occurs. When there is a lack of space and physical resources in carrying out learning activities during disasters, including in assessing learning outcomes, the ASES assessment model is an assessment model that can be used online as an assessment tool that can be used at any time to be able to overcome learning problems during crisis conditions. The ASES assessment model is a solution in assessing the disaster curriculum in the online learning system.

#### 4. CONCLUSION

Based on the results and discussion of the research study, the ASES assessment model has been developed as well as the aim research. Furthermore, validation of assessment model by several validator appraisers concluded that the ASES assessment model as a disaster curriculum assessment model in the online learning system was worthy. The ASES assessment model as a disaster curriculum assessment model in an online learning system has been trial to see its effectiveness. The ASES assessment model can be a solution in assessing the disaster curriculum in the online learning system.

#### REFERENCES

- Ramadhan, M. I., & Prihandoko, P. (2019). Penerapan Data Mining Untuk Analisis Data Bencana Milik BNPB Menggunakan Algoritma K-Means dan Linear Regression. *Jurnal Ilmiah Informatika Komputer*, 22(1).
- Kodoatie, R. J. (2021). *Rekayasa dan Manajemen Banjir Kota*. Penerbit Andi.
- Adiyoso, W. (2018). *Manajemen Bencana: Pengantar dan Isu-Isu Strategis*. Bumi Aksara.
- Yuliana, L., & Sastiarini, K. (2020). Peran Kepala Sekolah dalam Pelaksanaan Program Sekolah Siaga Bencana di Sekolah Dasar Unggulan 'Aisyiyah Bantul. *Jurnal Manajemen Pendidikan: Jurnal Ilmiah Administrasi, Manajemen Dan Kepemimpinan Pendidikan*, 2(2), 131-147.
- INDONESIA, P. R. (24). Undang-undang Republik Indonesia Nomor 24 Tahun 2007 tentang Penanggulangan Bencana.
- UNESCO and UNICEF. (2012). *Disaster Risk Reduction in School Curricula: Case Studies from Thirty Countries*. Geneva: United Nations Children Fund and Paris: United Nations Educational, Scientific and Cultural Organization
- Shaw, R., Sakurai, A., & Oikawa, Y. (2021). New realization of disaster risk reduction education in the context of a global pandemic: lessons from Japan. *International Journal of Disaster Risk Science*, 12(4), 568-580.
- Righi, E., Lauriola, P., Ghinoi, A., Giovannetti, E., & Soldati, M. (2021). Disaster risk reduction and interdisciplinary education and training. *Progress in Disaster Science*, 10, 100165.
- Parajuli, R. R. (2020). Citizen Disaster Science Education for effective disaster risk reduction in developing countries. *Geoenvironmental Disasters*, 7(1), 1-4.
- Proulx, K., & Aboud, F. (2019). Disaster risk reduction in early childhood education: Effects on preschool quality and child outcomes. *International Journal of Educational Development*, 66, 1-7.
- Ramesh, Dadi. (2021). An automated essay scoring system: a systematic literature review. *Artificial Intelligence Review* <https://doi.org/10.1007/s10462-021-10068-2>
- Zupanc, Kaza & Zoran Bosnic (2015). Advances in the Field of Automated Essay Evaluation. *Informatica* 39 383–395
- Uto, M., & Okano, M. (2020, July). Robust neural automated essay scoring using item response

- theory. In International Conference on Artificial Intelligence in Education (pp. 549-561). Springer, Cham.
14. Liu, J., Xu, Y., & Zhu, Y. (2019). Automated essay scoring based on two-stage learning. arXiv preprint arXiv:1901.07744.
  15. Brew, C., & Leacock, C. (2013). Automated short answer scoring: Principles and prospects. In *Handbook of Automated Essay Evaluation* (pp. 158-174). Routledge.
  16. J. W. Creswell, *Qualitative Inquiry & Research Design*. California: Sage Publications, Inc., 2013.
  17. W. R. Borg and M. D. Gall, (2005). *Educational Research an Introduction*, Fourth. New York: Longman