

Measuring Student Interest in the Industrial Revolution 4.0 Through Rasch Analysis

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Abstract

Interest in learning can help students in learning activities and get satisfying results. The phenomenon that occurs is the low student learning outcomes because of a lack of interest in learning possessed by students. This study measures student interest in the vocational high school (SMK) learning. This study involved 154 students. The instrument in the study was in the form of a learning interest questionnaire with a Likert model scale. Data were analyzed using the Rasch Model approach. The results showed that the learning interest of some students was in the medium category. In addition, there were 30 students who provided answers or showed outliers. As for the quality of the learning interest instrument used, it is good to be used to identify student interest in learning, we can see this from the reliability value of 0.97. The findings show that overall student interest in learning is in the medium category.

Keywords: Students, Interest in Learning, Rasch Model

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Introduction

The era of the Industrial Revolution 4.0 is an era in which humans race in developing abilities. They can obtain the intended ability through the learning process, followed by students (Yulianti et al., 2016). However, according to the results of the Program for International Student Assessment report (*Excellence and Equity in Education*, 2018) revealed that students in Indonesia have a decreased ability and the student achievement outcomes are still low. Decreased ability and low learning achievement by students is caused by several factors (Molstad & Karseth, 2016; Nurhasanah & Sobandi, 2016). One factor is because of students own the interest in learning that (Putrayasa et al., 2014).

Interest in learning is the tendency or high interest of someone towards something that aims to change, where it happens through an activity (learning) (Lin & Huang, 2016; Muldayanti, 2013; Wang & Adesope, 2016). In line with this, Ainley, Hillman, & Hillman (2002); Arnone, Small, Chauncey, & McKenna (2011) revealed that interest in learning as a psychic statement shows concentration of subject matter because the object is attractive to him. Hong & Lin-siegler, (2011); Rotgans & Schmidt (2014) states that interest in learning is one of the important factors students must possess that so that the learning process can run effectively. The factors that influence learning interest are student enjoyment in learning, student attention in learning, student curiosity, student determination in learning and student goals in learning (Hidi, 2006; Muller & Louw, 2004; Palfrey & Gasser, 2008). Edelson & Joseph (2001) mentioned 5 (five) aspects of learning interest, namely (1) students' enjoyment in learning, (2) students' attention in learning, (3) students' curiosity with subject, (4) student self-confirmation in learning, and (4) students' goals in learning.

The symptom that arises from the low learning interest students own that students are not interested in taking part in learning activities (Firmansyah, 2015). Students who are not focused on learning (Budiwibowo, 2016). And students obtains the low achievement of learning outcomes (Sakti et al., 2012). Aritonang (2008) mentioning the low student interest in learning can also interfere with the purpose of learning activities. Interest in learning is one important factor, so students can follow the learning process well and effectively (Rotgans & Schmidt, 2014).

This study measures the interest in learning that is owned by students, so students who have a high interest in learning obtain satisfying learning outcomes.

Method

This research uses a quantitative approach with a descriptive design (Yusuf, 2014). The population in this study amounted to 250 students. The sampling technique in the study used proportional random sampling (Sugiyono, 2012). So that the sample in this study amounted to 154 students comprising class X, XI and class XII students. The research instrument in the form of a questionnaire that contains statements about students' interest in learning. The instrument in research uses a Likert scale model which has five alternative answers namely; very suitable, appropriate, appropriate, not suitable very inappropriate. Research data were analyzed using Rasch Model fit statistics (Alagumalai et al., 2005; Bond & Fox, 2007). Fit statistical analysis using MNSQ outfit parameters with the ideal range ($+0.5 > \text{MNSQ} < +1.50$) (Sumintono & Widhiarso, 2015). The Rasch Model is used to measure the quality of instruments of interest in learning and to describe the interest in learning possessed by students.

Results and Discussion

To achieve the research objectives, there are two stages carried out; (1) assessing the property and quality of instruments of interest in learning, and (2) assessing the ability of students to respond to instruments of interest in learning.

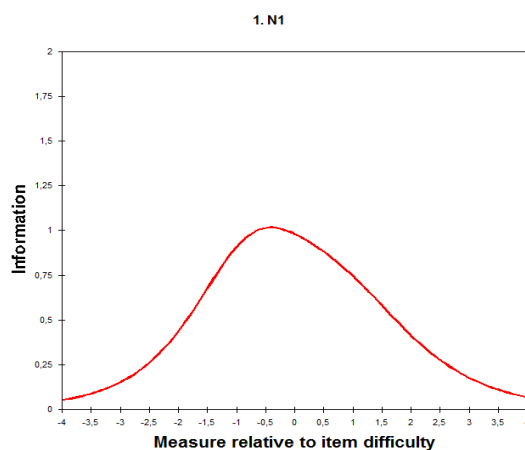
Instrument Quality Test

The aspects used to test the quality of learning interest instruments are; (1) reliability and separation index, (2) dimension test, (3) item fit and misfit, and (4) instrument information function (Smith et al., 1995).

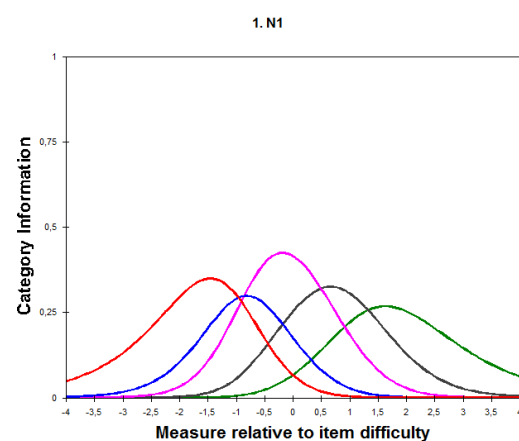
Tabel 1. Summary of quality instrument items (N item = 46 item)

Estimation	Values
Item Reliabilities	0.97
Separation Index of Item	5.58
Mean Item	0.00
Mean OUTFIT MNSQ	1.00
Raw Variance Explained by Measures	29.9%
Raw Variance Unexplained by Measures	70.1%

The table results from the instrument of interest in learning, the reliability of the instrument is at 0.97. This shows that the reliability of the instrument of learning interest is at a very good level, even close to the perfect score. This value is also supported by the value of the separation index of items that can set the item to 5 (five), this can be interpreted that the instrument of interest in learning can measure up to 5 (five) groups from the highest to the lowest. This shows that the distribution of instrument items can measure almost all aspects. To identify the value of the variance, an analysis of the main components (PCA) is obtained to obtain a result of 29.9%, this can be interpreted that the instrument undimension conditions have been met ($> 20\%$) (Linacre, 2006), or 46 items in the instrument of interest in learning can measure learning interest in students.



Gambar 1. Instrument information fungtion (TIF)



Gambar 2. Probability of student answers on each choice answer

Based on Figure 1, we obtain information that the output of information collected through learning interest instruments is in the high, medium and low categories. This shows that each student has different learning interests in taking part in learning. This explanation is supported by the opinion of Feriady, Harnanik, & Sunarto (2012); Laginder & Stenøien (2011) which states that each student has a different learning interest, sometimes it can go up and it can go down. The findings are also supported by Figure 2, where the probability of the choice of answers is very appropriate, appropriate, appropriate, not appropriate and not very appropriate. In figure 2 it also appears that students have no difficulty answering instruments of interest in learning. However, from Figure 2 it can be seen that students 'answers are stable and or students' interest in learning is in the moderate category (+0.23 logit). This explanation is also supported by the opinion of Terrell (2012) which states that many things affect the interest in learning, including teaching methods of teachers, psychological conditions and learning environment.

To find out the items categorized as fit and misfit on the instrument of interest in learning, it can be shown by comparing the average MNSQ Outfit value of + 1.00 logit, this means that 46 items of interest in learning instruments have no misfit, or that 46 items learning interest is appropriate to measure the learning interest possessed by students.

Realization of Student Performance in Learning Interest Instruments Based on Fit Statistics

To determine the ability of students to work on instruments of interest in learning, it carries an evaluation out through individual measurements and individual compatibility. It uses both as a basis for determining students who have high learning interest and who have low learning interest, and students who are not suitable to give answers.

Tabel 2. *Summary of person (adolescents) Measured Based on Rasch Fit Statistics* (N person = 154)

Estimation	Values
Person Reliabilities	0.87
Separation Index of Person	2.62
Mean Pearson	0.23
Mean Outfit MNSQ	1.00
Cronbach alpha (KR-20) Person Raw Score "Instrument" Reliability	89.0%

Based on the table above it is known that there are students who have an interest in learning while taking part in the learning process, this is stated with Mean Person 0.23 (> 0.00 logit). From the table above it is also known that the stability of students in providing answers to instruments of interest in learning is in the good category (0.87), this can be interpreted as a good interaction between students and instrument items.

We also explored students who gave answers that did not match the instrument (Misfit), out of 154 students there were 30 students who had +0.50 logit <OUTFIT MNSQ> +1.48 logit. It displays student data in the following table.

Tabel 3. Misfit Order of Respondents

#Res.	OUTFIT MNSQ	#Res.	OUTFIT MNSQ	#Res.	OUTFIT MNSQ
105	03.16	87	0,090972	146	00.46
152	02.50	70	0,088194	122	00.45
21	02.28	46	0,085417	138	00.41
92	02.18	47	01.55	1	00.39
28	02.16	75	01.53	137	00.42
19	02.14	11	01.56	104	00.40
9	0,107639	18	01.56	100	00.39
57	0,104167	27	01.49	68	00.35
40	0,096528	88	00.47	85	00.31
136	0,09375	33	00.47	81	00.26

Based on the above table, students with code 105 (3.16 logit) are students who have the highest ability in answering instruments of learning interest among 154 other students. And students with code 081 (0.26 logit) are students who have the low ability in answering instruments of learning interest. This means that students with code 105 have the highest level of interest in learning related to 5 (five) aspects, namely (1) students' enjoyment in learning, (2) students' attention in learning, (3) students' curiosity with subject, (4) students' self-confirmation in learning, and (4) students' goals in learning. This explanation is supported by the opinion of Abrantes, Seabra, & Lages (2007); Ainley & Ainley (2011); Rotgans & Schmidt (2011) which states in the learning process needed interest from students, and interest arises from students' interest and curiosity about a lesson.

The above analysis shows that the quality of the learning interest instruments given to students is very satisfying. It can be seen in the item's reliability and person, the index of separation and the unidimensional instruments are very adequate. But to measure the ability of students to fill the instrument of interest in learning, there were 30 students among 154 students who answered incorrectly or outliers, ie students who presented responses were not in accordance with the instruments filled out. Students who answer are not appropriate or outliers, because there is cheating and or origin in giving responses to the instrument of interest in learning.

Conclusion

Overall, it can be concluded that the instrument of interest in learning in this study is very good to be used to measure student interest in learning, be it high, moderate learning interest or low learning interest. This study also revealed the level of interest in learning of all students. This is supported by the interaction of students in responding to items, which are in the good category. Although there are still 30 students who are not suitable for giving answers or misfit, there are indications of cheating or answering instruments by guessing. From the analysis of the above data it can also be concluded that overall the learning interest possessed by students is in the medium category. This means that many factors influence learning interest, such as teacher teaching methods, students' psychological conditions and environmental conditions.

References

- Abrantes, J. L., Seabra, C., & Lages, L. F. (2007). Pedagogical affect , student interest , and learning performance. *Journal of Business Research*, 60, 960–964. <https://doi.org/10.1016/j.jbusres.2006.10.026>
- Ainley, M., Hillman, K., & Hillman, K. (2002). Gender and Interest Processes in Response to Literary Texts: Situational and Individual Interest. *Learning and Instruction*, 12, 411–428.
- Ainley, Mary, & Ainley, J. (2011). Student engagement with science in early adolescence : The contribution of enjoyment to students ' continuing interest in learning about science. *Contemporary Educational Psychology*, 36(1), 4–12. <https://doi.org/10.1016/j.cedpsych.2010.08.001>
- Alagumalai, S., Curtis, D. D., & Hungi, N. (2005). *Applied Rasch Measurement: A Book of Exemplars: Papers in Honour of John P. Keeves (Education in the Asia-Pacific Region: Issues, Concerns and Prospects)*. Springer. <https://doi.org/10.1007/9781402030727>
- Aritonang, K. T. (2008). Minat dan Motivasi dalam Meningkatkan Hasil Belajar Siswa. *Jurnal Pendidikan Penabur*, 10, 11–21.
- Arnone, M. P., Small, R. V., Chauncey, S. A., & McKenna, H. P. (2011). Curiosity, interest and engagement in technology-pervasive learning environments: a new research agenda. *Education Tech Research Dev*, 59, 181–198. <https://doi.org/10.1007/s11423-011-9190-9>
- Bond, T. G., & Fox, C. M. (2007). *Applying the Rasch Model, Fundamentals Measurement in the Human Science* (2nd ed.). Lawrence Erlbaum Associates.
- Budiwibowo, S. (2016). The Relationship between Students' Learning Interest and Students' Achievement on Social Science in SMP Negeri 14 Madiun. *Jurnal Studi Sosial*, 1(1), 60–68.
- Edelson, D. C., & Joseph, D. M. (2001). *Motivating Active Learning: A design framework for interest driven learning*. Northwestern University.
- Feriady, M., Harnanik, H., & Sunarto, S. (2012). GURU DAN FASILITAS BELAJAR SISWA TERHADAP MINAT BELAJAR IPS KELAS VIII SMP N 3 PURBALINGGA No Keterangan Setuju Frekuensi % Pelajaran IPS Merupakan Pelajaran yang paling menyenangkan Pelajaran IPS merupakan pelajaran yang mudah dimengerti dan dipahami Pad. 1(2).
- Firmansyah, D. (2015). PENGARUH STRATEGI PEMBELAJARAN DAN MINAT BELAJAR TERHADAP HASIL

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- BELAJAR MATEMATIKA. *Jurnal Pendidikan UNSIKA*, 3(1), 34–44.
- Hidi, S. (2006). Interest: A Unique Motivational Variable. *Educational Research Review*, 14, 23–40.
- Hong, H., & Lin-siegler, X. (2011). How Learning About Scientists' Struggles Influences Students' Interest and Learning in Physics. *Journal of Educational Psychology*, 1–16. <https://doi.org/10.1037/a0026224>
- Laginder, A., & Stenøien, J. M. (2011). Learning by Interest : Experiences and Commitments in Lives with Dance and Crafts. *Vocations and Learning*, 4, 151–167. <https://doi.org/10.1007/s12186-011-9055-8>
- Lin, S.-H., & Huang, Y.-C. (2016). Examining Charisma in Relation to Students Interest in Learning. *Active Learning in Higher Education*, 17(2), 139–151.
- Linacre, J. M. (2006). *A User's Guide to WINSTEPS Ministeps Rasch-Model Computer Programs*.
- Molstad, C. E., & Karseth, B. (2016). National Curricula in Norway and Finland: The Role of Learning Outcomes. *European Educational Research Journal*, 7(4), 257–276.
- Muldayanti, N. D. (2013). PEMBELAJARAN BIOLOGI MODEL STAD DAN TGT DITINJAU DARI KEINGINTAHUAN DAN MINAT BELAJAR SISWA. *Jurnal Pendidikan IPA Indonesia*, 3(1), 12–17.
- Muller, F. H., & Louw, J. (2004). *Learning environment , motivation and interest : Perspectives on self-determination theory*. 34(2), 169–190.
- Nurhasanah, S., & Sobandi, A. (2016). Minat belajar sebagai determinan hasil belajar siswa. *JURNAL PENDIDIKAN MANAJEMEN PERKANTORAN*, 1(1), 128–135.
- Palfrey, J., & Gasser, U. (2008). *Born digital: Understanding the first generation of digital natives*. Perseus Books Group.
- Excellence and Equity in Education, (2018).
- Putrayasa, I. M., Syahrudin, H., & Margunayasa, I. G. (2014). PENGARUH MODEL PEMBELAJARAN DISCOVERY LEARNING DAN MINAT BELAJAR TERHADAP HASIL BELAJAR IPA SISWA. *Jurnal Mimbar PGSD Universitas Pendidikan Ganesha Jurusan PGSD*, 3(1), 1–11.
- Rotgans, J. I., & Schmidt, H. G. (2011). Situational interest and academic achievement in the active-learning classroom. *Learning and Instruction*, 21(1), 58–67. <https://doi.org/10.1016/j.learninstruc.2009.11.001>
- Rotgans, J. I., & Schmidt, H. G. (2014). Situational Interest and Learning: Thirst for Knowledge. *Learning and Instruction*, 32, 37–50.
- Sakti, I., Puspasari, Y. M., & Risdianto, E. (2012). PENGARUH MODEL PEMBALAJARAN LANGSUNG (Direct Instruction) MELALUI MEDIA ANIMASI BERBASIS MACROMEDIA FLASH TERHADAP MINAT BELAJAR DAN PEMAHAMAN KONSEP FISIKA SISWA DI SMA PLUS NEGERI 7 KOTA BENGKULU. 10(1), 1–10.
- Smith, R. M., Schumacker, E. R., & Bush, M. J. (1995). Using item mean squares to evaluate fit to the Rasch model. *Journal of Outcome Measurement*, 1–7.
- Sugiyono. (2012). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D* (17th ed.). Alfabeta.
- Sumintono, B., & Widhiarso, W. (2015). *Aplikasi Pemodelan Rasch pada Assessment Pendidikan*. Trim Komunikata.
- Terrell, S. R. (2012). Introduction to the special issue of the American Educational Research Association ' s online teaching and learning special interest group (SIG-OTL). *The Internet and Higher Education*, 15(2), 79–80. <https://doi.org/10.1016/j.iheduc.2012.01.001>
- Wang, Z., & Adesope, O. (2016). Exploring the Effects of Seductive Details with The 4- Phasemodel of Interest. *Learning and Motivation*, 55, 65–77.
- Yulianti, Ip., Sano, A., & Ildil, I. (2016). SELF REGULATED LEARNING SISWA. *Jurnal EDUCATIO: Jurnal Pendidikan Indonesia*, 2(April), 98–102.
- Yusuf, A. M. (2014). *Metode Penelitian: Kuantitatif, Kualitatif, dan Penelitian Gabungan* (1st ed.). Pnamedia Group.
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