JRERE 11 (1) 2022 62-69

Journal of Research and
Educational Research Evaluation
http://journal.unnes.ac.id/sju/index.php/jere

Validity and Reliability of Development of Self-confidence Assessment Instruments for Students on Chemistry Subject

Annisa Etika Arum[1]✉, Muhammad Khumaedi[2], Endang Susilaningsih[3]

[1,2,3]Universitas Negeri Semarang, Indonesia

Article Info

History Articles
Received:
25 December 2021
Accepted:
19 January 2022
Published:
30 March 2022

Keywords:
Instrument of assessment, self-confidence, validity, reliability

Abstract

Self-confidence assessment instrument in Chemistry subjects is very necessary, but there is no self-confidence assessment instrument in Chemistry subjects. The purpose of this study was to test the validity and reliability of confidence assessment instruments in Chemistry subjects. The research and development method used in this study is the model of non-test instrument development proposed by Mardapi. The participant is a document and an expert. Data collection using a questionnaire with 10 statements. The research instrument uses a questionnaire with a rating scale of 1 to 5. Data analysis using Aiken's V formula for content validity test with the help of Microsoft Excel and reliability estimation using Intraclass Correlation Coefficients (ICC) for reliability test between rater with the help of SPSS 25. The data of the results showed the value of Aiken's coefficient V on each item of the statement is ≥ 0.3, then it can be said that all aspects are valid. In addition, the estimation of reliability also produces an intraclass correlation coefficients (ICC) value of 0.735, then it can be said that this instrument is quite reliable. Thus, it can be concluded that the confidence assessment instrument in Chemistry subjects has high validity and reliability between rater is quite strong and is expected to be used as a reference for affective domain assessment for students.

✉Correspondence Address :
Postgraduate, Universitas Negeri Semarang
Jalan Kelud Utara III, Kel. Petompon Kec. Gajah Mungkur
Kota Semarang 50237
E-mail : annisaea72@gmail.com

p-ISSN 2252-6420
e-ISSN 2503-1732

INTRODUCTION

Learning in the curriculum 2013 states that teachers are required to pass an assessment of students include affective domain assessment (attitude), cognitive domain assessment (knowledge), and psychomotor domain assessment (skills). In its implementation, teacher competence requires to develop measurement instruments, assessment, evaluation of student learning processes and outcomes. Educators have an important role in learning such as designing all that will be done before conducting the process of teaching students. The research resulted in a survey that proves that in measuring the success of education is only measured based on the excellence of the Cognitive Realm so that the assessment of the affective realm and the psychomotor realm is less considered. Meanwhile, according to curriculum 2013 in the learning process is recommended to conduct an assessment of the overall realm of Cognitive, Affective, and psychomotor in learners. After following the learning there will be changes in learners such as increased knowledge and insight, confidence, feeling happy, and so forth (Hamzah, 2012).

The attitude of a person who describes a sense of pleasure with his own reality is called self-acceptance. A person who is satisfied with his quality will always feel safe, not easily disappointed, and better understand what he wants, so that he is able to live independently and not always depend on others in deciding everything. A person who has self-confidence has a positive self-image and concept. Research (Fitri et al., 2018). revealed that if you have confidence in being able to get the job done well or at least learn how to get the job done. Optimistic attitude is able to convince himself to be able to do anything and will always try to achieve the desired goal, as well as provide the ability to be able to overcome fear. Therefore, a person who has confidence will try to be optimistic in doing all activities, thinking about realistic goals, making life goals, planning the future and feeling confident in achieving the goals that have been decided.

Affective assessment (attitude) is considered important for everyone, but nevertheless in its implementation is still very lacking. Affective assessment by teachers during this time still emphasizes on the assessment of the cognitive Sphere (Knowledge), so the assessment of the affective sphere (attitude) is still carried out with a cursory observation because there is not yet available the standard affective sphere assessment instrument (attitude). Development of Affective sphere assessment (attitude) using non-tes instruments. According to Krathwol taxonomy, there are five levels of Affective aspect (attitude), namely: receiving, responding, valuing, organization, and characterization (Tim Pengembang Ilmu FIP-UPI, 2007, p116).

Chemistry has many benefits in everyday life. The needs of food, clothing, materials for the Home, household appliances, medicines, cosmetics, and various materials from means of Transportation are chemical products. Chemistry can help in thinking rationally, which in its Learning explains concepts, facts, procedures and natural phenomena fundamentally (Sulastri & Rahmadani, 2017, p2). Basic competencies of social attitudes in the 2013 curriculum, overall attitude competencies that must be owned by students, namely discipline, responsibility, confidence, respect, love the country, caring, honest, creative, curiosity, cooperate, critical, careful, thorough, orderly, polite, open, and diligent. Attitude is more directed to the tendency of learners to follow the lesson as a response in the form of positive or negative. The higher the positive response of students, the greater the interest of students to the lessons given by teachers. Therefore, attitude can be called a determinant of success in classroom learning (Wicaksono et al., 2016). In everyday life acids and bases are two very important chemical compounds. In general, acid solutions are compounds that have a sour taste containing acids, such as acetic acid in

vinegar solutions used in food mixtures, as well as ascorbic acid in vegetables such as tomatoes, carbonic acid in carbonated beverages such as coca-cola, and so on. Alkaline solutions are known as compounds that have slippery properties and bitter taste, such as sodium hydroxide in laundry soap, magnesiu, hydroxide such as antacids contained in gastric pain medication when dissolved in water. Although acid and base solutions can be distinguished through taste, it is not recommended to directly taste the acid or base solutions present in the laboratory (Chang, 2005, p96).

Perry (2005, p9) writes in his book that self-confidence is one of the things that is needed in achieving success, feeling capable, comfortable and satisfied without the need for recognition from others. Self-confidence is the confidence possessed by a person who is able to support the achievement of goals in his life by not giving up even though in the process of achievement encountered problems or failures. Self-confidence is the belief and belief in the ability of self, optimistic, objective, responsible, rational and realistic in overcoming a difficulty through his best condition, so that he can give something and be accepted by others (Sin, 2017). According to Lauster (2015, p8) there are several characteristics to assess self-confidence, among others, as follows: (1) Believe in one's own ability, which is a belief in oneself against all events that occur (2) act independently in making decisions, which is able to act in making decisions about what is done independently without the involvement of others; (3) have a positive; (4) dare to express an opinion, that is to have an attitude to be able to express something that wants to be expressed to others without coercion.

The development of a confident instrument helps a person to express their feelings as well as opinions towards a sense of confidence (Amir, 2015). Confidence can lead students in the process of achieving achievements and better learning outcomes (Aristiani, 2016). Research Karimi & Saadatmand (2014) revealed that found a relationship between self-confidence with academic achievement. Syam & Amri (2017) explains that the most valuable thing in a person is one of them is self-confidence, because with that confidence a person is able to explain all the potential that exists in itself.

Based on the review of several research results that have been done shows that the development of instruments in mathematics subjects has a value of validity and high reliability value (Gaol et al., 2017). Then, research from Marliza et al., (2015) showed valid and reliable results in affective instrument item (attitude) with likert scale. The development of affective domain assessment is important to be more concerned in order to get a balance between cognitive domain assessment and affective domain assessment, because the implications of affective domain neglect will actually harm individual learners and society.

Knowing the importance of self-confidence (Sheldrake, 2016) referring to a review of previous research that attitude instruments in Chemistry subjects are still global yet specific to measure certain attitudes, it is known there is no development of self-confident attitude assessment instruments students in Chemistry subjects. Therefore, it is necessary to conduct research on the development of confident attitude assessment instruments in Chemistry subjects in order to get a good assessment instrument, which meets valid and reliable rules. Validity is considered very important in content analysis. If the measuring instrument used is wrong, then it is certain that the findings produced are also not reliable.

Validity is a way to ascertain whether the measuring instrument used by the researcher is valid (valid) and also ensures that the findings in the study also result from precise measurements. There are several types of validity known in content analysis, the main validity commonly used in content analysis are face validity, concurrent validity, construct validity, predictive validity, and content

validity. Process-oriented validity is expected to assess the extent to which a measuring instrument can represent the relationships in the data. One of the validity types included in this category is the validity of the content, which is to measure the extent to which the measuring instrument completely includes all the categories you want to see (Suwito, 2011, p259-260). Of the five types of validity, the validity of the contents to be used at an early stage in the process of developing non-test assessment instruments. In addition, the validity of the content can help ensure the validity of the construct on the development of the self-confidence assessment instrument to be developed to see the extent to which the measuring instrument represents a concept, theory or model that has been recognized in order to give confidence to the reader about the instrument to be developed. In addition, reliability between rater is important in the development of assessment instruments if the data collected in the form of observations of one's behavior. Reliability is used when the rater or appraiser is involved between two or more assessors (Kusumastuti et al., 2020, p91). Carrying out validity test and reliability estimation is important used in development research (Morgado et al., 2017); (Rausch et al., 2016);(Ahmad, & Khumaedi, 2017). The purpose of this study was to examine the validity and reliability of the instrument assessment of confident attitude in Chemistry subjects.

METHODS

Research method used is the development research method, using this research and development design using the development of nontes instruments proposed by Mardapi (2018, p88) which consists of 10 stages, namely: (1) determining instrument specifications, (2) Writing Instruments, (3) determining instrument scales, (4) determining scoring systems, (5) Mentelaah instruments, (6) conducting trials, (7) analyzing instruments, (8) assembling instruments.

Development research through measures such as, planning instrument specifications, instrument feasibility tests, and instrument trials. These steps can later produce a good final product of research. In the development steps there is a validity test step and reliability estimation step on the instrument, it is considered in accordance with the purpose of this study is to test the validity test and reliability estimation of the instrument assessment of confident attitude on chemical subjects so that the instrument can be accounted for. After passing the step of planning the instrument specification, continued on the feasibility test which includes the validity of the content and the estimation of reliability in the assessment instrument. In this study the validity of the content using the validity of Aiken's V assessment is done by giving a questionnaire to the appraiser with a number between 1 to 5. The coefficient if it meets the valid criteria is 0.30 (Azwar, 2016, p175). The formula in question is as follows:

$$V=\frac{\Sigma(ri-lo)}{[n(c-1)]}$$

lo = lowest Validity Rate

c = highest validity rate

r = number given by an appraiser

s = r-lo

Reliability estimation using reliability inter rater Intraclass Correlation Coefficients (ICC). The Intraclass Correlation Coefficients (ICC) formula according to Mardapi (2012, p89) is as follows:

rxx = $(Ss2 - Se2)/[\ Ss2+(k-1)Se2]$….(1)

rxx = reliability between rater

$Ss2$ = variant between subjects (in this case items) subject to rating

$Se2$ = error variance, i.e. the variance of interaction between item or subject (s) and rater (R)

k = the number of rater that gives the assessment

The reliability coefficient criteria refer to (Giuseppe, 2018) as follows:

Table 1. Criteria of Intraclass reliability coefficient correlation (ICC)

ICC	Kriteria
<0.50	Poor
0.50-0.75	Fair
0.75-0.90	Good
0.90-1	Excellent

(Giuseppe, 2018)

The research subjects amounted to 4 rater consisting of 3 lecturers of Educational Evaluation and teaching chemistry education courses and 1 Teacher of Chemistry subjects at the high school level. Data collection using questionnaire instrument using Likert scale 1 to 5. The expert assessment sheet is used to find out how relevant the conceptual and operational in the assessment instrument developed.

RESULTS AND DISCUSSION

Research aims to develop an instrument of assessment of the confident attitude of students on the subject of chemistry. The results of research on the development of a confident attitude assessment instrument in the form of a questionnaire instrument with 4 confident indicators with 10 statement items. Instrument development needs to conduct a feasibility test of the instrument before conducting the test phase. Feasibility test includes validity test and reliability estimation, if the validity test on the instrument gets high validity, then the assessment instrument is considered able to perform its measuring function in accordance with the purpose of the assessment itself, while if the assessment instrument has low validity, it is said to produce data that is not in accordance with the purpose of the assessment itself. In this study the validity of the content resulted in the validity of Aiken's V content is as follows:

Table 2. Aikens'V test result

Item	Penilai									
	A		B		C		D		∑s	V
	Skor	s	Skor	s	Skor	s	Skor	s		
P1	2	1	3	2	2	1	3	2	6	0.3
P2	3	2	3	2	3	2	3	2	8	0.4
P3	4	3	4	3	5	4	4	3	13	0.65
P4	4	3	4	3	4	3	4	3	12	0.6
P5	5	4	5	4	4	3	5	4	15	0.75
P6	5	4	5	4	4	3	5	4	15	0.75
P7	4	3	4	3	4	3	5	4	13	0.65
P8	4	3	5	4	5	4	5	4	15	0.75
P9	4	3	4	3	3	2	4	3	11	0.55
P10	3	2	3	2	4	3	3	2	9	0.45

Based on Table 2, statement 1 shows the value of Aiken's coefficient V of 0.3, statement 2 shows the value of Aiken's coefficient V of 0.4, statement 3 shows the value of Aiken's coefficient V of 0.65, statement 4 shows the value of Aiken's coefficient V of 0.6, statement 5 shows Aiken's coefficient V of 0.75, statement 6 shows Aiken's coefficient V of 0.75, statement 7 shows Aiken's coefficient V of 0.65, statement 8 shows Aiken's coefficient V of 0.75, statement 9 shows Aiken's V by 0.55, and aspect 10 shows the value of Aiken's V coefficient of 0.45. The overall validity of the result V is 0.585. The value of all aspects compared with the minimum criteria of Aiken's V is 0.30 according to Azwar (2016, p175), it is said that all aspects of the

questionnaire assessment instrument confident attitude of students on the subject is valid and has a high validity.

Reliability estimation using reliability between rater Intraclass Correlation Coefficients (ICC). Use Intraclass Correlation Coefficients (ICC) because the number of rater is more than two rater. ICC analysis shows results of the following amounts:

Table 3. Reliability results of Intraclass correlation coefficient (ICC)

		95% Confidence Interval F Test with True Value 0					
	Intraclass Correlationb	Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.735a	.474	.914	12.121	9	27	.000
Average Measures	.917c	.783	.977	12.121	9	27	.000

According to the reliability between Rater Intraclass Correlation Coefficients (ICC) the reliability coefficient refers to Giuseppe (2018: 4) as follows:

Table 4. Criteria of Intraclass reliability coefficient correlation (ICC)

ICC	Kriteria
<0.50	Poor
0.50-0.75	Fair
0.75-0.90	Good
0.90-1	Excellent

(Giuseppe, 2018)

The results of the ICC calculation of 0.735 in Table 3 compared with the ICC koefisian criteria in Table 4, it can be said that the rater agreement is quite strong, and the rater has a fairly good consistency.

A confident attitude instrument is needed to help teachers support the implementation of assessments in the learning process in the classroom. However, there are still few affective (attitude) instruments especially in Chemistry subjects and there is no confident attitude assessment instrument specifically in Chemistry subjects. Therefore, it is necessary to develop an instrument of assessment of students' confidence in Chemistry subjects. Research (Tallam et al., 2022); (Lamster & Benson, 2017); (García-Vidal et al., 2019) opportunities for capacity building in service are needed to build confidence. Knowledge and confidence are essential elements necessary for practice readiness (Ray et al., 2022);(Mohebi et al., 2019). Students who are more likely to think critically are also more open to diversity and challenges as well as having a stronger self-concept (Álvarez-Huerta et al., 2022). Improving knowledge, confidence and attitude has the potential to reduce adverse effects on children (Norman & Taha, 2019). Research results (Guerrero et al., 2022) professional nurses and students can increase their confidence using realistic scenarios provided by simulation methods so that they can improve their competence through different and unique experiences. The satisfaction obtained by nurses and nursing students during this exposure is essential to gain confidence and demonstrate a successful learning experience.

Referring to the results of the validity test and reliability estimation that has been done, it can be said that the instrument of assessment of confident attitude in Chemistry subjects has a high content validity and has a fairly good reliability between raters.

CONCLUSION

Based on the results and discussion, it can be concluded that the instrument of assessment of confident attitude in Chemistry subjects with validity value using Aiken's V

formula is adequate with overall validity of the result V is 0.585, and the estimation of reliability between rater using Intraclass Correlation Coefficients (ICC) with reliability results are quite reliable of 0.735. Therefore, the instrument of confident assessment on the subject of chemistry can be continued in the trial step on students. Confident attitude assessment instrument in Chemistry subjects in the form of non-test instruments, namely questionnaire instrument consists of 4 confident indicators with 10 statement items.

REFERENCES

Ahmad sholeh, & M. Khumaedi, S. E. P. (2017). Pengembangan Instrumen Penilaian Mata Pelajaran PKn Standar Kompetensi Memahami Kedaulatan Rakyat Dalam Sistem Pemerintahan di Indonesia. *Journal of Research and Educational Research Evaluation*, *6*(1), 71–80.

Álvarez-Huerta, P., Muela, A., & Larrea, I. (2022). Disposition toward critical thinking and creative confidence beliefs in higher education students: The mediating role of openness to diversity and challenge. *Thinking Skills and Creativity*, *43*(12), 1–14.

Amir, N. (2015). Instrument Development of Self-Confidence for Badminton Athletes. *ANIMA Indonesian Psychological Journal*, *30*(2), 101–110.

Aristiani, R. (2016). Meningkatkan Percaya Diri Siswa Melalui Layanan Informasi Berbantuan Audiovisual. *Jurnal Konseling Gusjigang*, *2*(2), 182–189.

Azwar, S. (2016). *Tes Prestasi*. Yogyakarta: Pustaka Pelajar.

Chang, R. (2005). *Kimia Dasar Konsep-Konsep Inti Edisi Ketiga Jilid 1*. Jakarta: Erlangga.

Fitri, E., Zola, N., & Ifdil, I. (2018). Profil Kepercayaan Diri Remaja serta Faktor-Faktor yang Mempengaruhi. *JPPI (Jurnal Penelitian Pendidikan Indonesia)*, *4*(1), 1–5.

Gaol, P. L., Khumaedi, M., & Masrukan, M. (2017). Pengembangan Instrumen Penilaian Karakter Percaya Diri pada Mata Pelajaran Matematika Sekolah Menengah Pertama. *Journal of Educational Research and Evaluation*, *6*(1), 63–70.

García-Vidal, G., Sánchez-Rodríguez, A., Pérez-Campdesuñer, R., & Martínez-Vivar, R. (2019). The impact of self-confidence, creativity and vision on leadership performance: Perceptions at Ecuadorian SMEs owner/managers. *Serbian Journal of Management*, *14*(2), 315–325.

Giuseppe, P. (2018). StaTips Part IV: Selection, interpretation and reporting of the intraclass correlation coefficient. *South Eur J Orthod Dentofac Res (SEJODR)*. *1*(5), 3–5.

Guerrero, J. G., Ali, S. A. A., & Attallah, D. M. (2022). The Acquired Critical Thinking Skills, Satisfaction, and Self Confidence of Nursing Students and Staff Nurses through High-fidelity Simulation Experience. *Clinical Simulation in Nursing*, *64*, 24–30.

Hamzah, S. H. (2012). Aspek Pengembangan Peserta Didik: Kognitif, Afektif, Psikomotorik. *Dinamika Ilmu*, *12*(1), 1–22.

Karimi, A., & Saadatmand, Z. (2014). The Relationship between Self-Confidence with Achievement Based on Academic Motivation. *Kuwait Chapter of Arabian Journal of Business and Management Review*, *4*(1), 210–215.

Kusumastuti, A., Khoiron, A. M., & Achmadi, T. A. (2020) *Metode Penelitian Kuantitatif*. Yogyakarta: Budi Utama.

Lamster, M., & Benson, R. (2017). Building confidence. *Architectural Record*, *26*(3), 114–118.

Lauster, P. (2015). *Tes Kepribadian* (*Terjemahan*). Jakarta: PT Bumi Aksara.

Mardapi, D. (2018). *Teknik Penyusunan Instrumen Tes dan Nontes*. Yogyakarta: Parama Publishing.

Marliza, Yusrizal, & Abdullah. (2015). Pengembangan Instrumen Penilaian Afektif Untuk Mengukur Sikap Siswa Terhadap Nilai Atau Norma yang Berhubungan Dengan Materi Keanekaragaman Hayati Indonesia. *Jurnal Biotik*, *3*(2), 89–99.

Mohebi, S., Parham, M., Sharifirad, G., & Gharlipour, Z. (2019). The relation between self-confidence and risk-taking among the students. *Journal of Education and Health Promotion*, *8*(2), 1–4.

Morgado, F. F. R., Meireles, J. F. F., Neves, C. M., Amaral, A. C. S., & Ferreira, M. E. C. (2017). Scale development: Ten main limitations and recommendations to improve future research practices. *Psicologia: Reflexao e Critica*, *30*(1), 1–20.

Norman, S. L., & Taha, A. A. (2019). Delirium knowledge, self-confidence, and attitude in pediatric intensive care nurses. *Journal of Pediatric Nursing*, *46*, 6–11.

Perry, M. (2005). *Confidence Boosters (Pendongkrak Kepercayaan Diri).* Jakarta: Erlangga.

Rausch, A., Seifried, J., Wuttke, E., Kögler, K., & Brandt, S. (2016). Reliability and validity of a computer-based assessment of cognitive and non-cognitive facets of problem-solving competence in the business domain. *Empirical Research in Vocational Education and Training*, *8*(1), 1–23.

Ray, S. R., Taylor, E., Sherrill, K. J., Steinheiser, M. M., & Berndt, D. L. (2022). Effect of infusion therapy interactive modules on nursing student's knowledge and self-confidence. *Teaching and Learning in Nursing*, *17*(1), 109–112.

Sheldrake, R. (2016). Confidence as motivational expressions of interest, utility, and other influences: Exploring under-confidence and over-confidence in science students at secondary school. *International Journal of Educational Research*, *76*, 50–65.

Sin, T. H. (2017). Tingkat Percaya Diri Atlet Sepak Bola dalam Menghadapi Pertandingan. *Jurnal Fokus Konseling*, *3*(2), 163–174.

Sulastri & Rahmadani, R. F. (2017). *Kimia Dasar 1*. Banda Aceh: Syiah Kuala University Press.

Suwito. (2011). *Analisis isi: Pengantar Metodologi untuk Penelitian Ilmu Komunikasi dan Ilmu-ilmu Sosial Lainnya*. Jakarta: Kencana.

Syam, A., & Amri. (2017). Pengaruh Kepercayaan Diri (Self Confidence) Berbasis Kaderisasi Imm Terhadap Prestasi Belajar Mahasiswa (Studi Kasus Di Program Studi Pendidikan Biologi Fakultas Keguruan Dan Ilmu Pendidikan Universitas Muhammadiyah Parepare). *Jurnal Biotek*, *5*(1), 87–102.

Tallam, E., Kaura, D., & Mash, R. (2022). Midwives' self-perceived confidence in their knowledge and skills in Kenya: An observational cross-sectional study. *International Journal of Africa Nursing Sciences*, *16*, 1–8.

Tim Pengembang Ilmu FIP-UPI. (2007). *Ilmu & Aplikasi pendidikan Bagian 2*. Bandung: IMTIMA.

Wicaksono, T. P., Muhardjito, & Harsiati, T. (2016). Pengembangan Penilaian Sikap Dengan Teknik Observasi , Self Assessment , Dan Peer Assessment Pada Pembelajaran Tematik Kelas V Sdn Arjowinangun 02 Malang. *Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan*, *1*(1), 45–51.