Report on Academic Success Skills Indicators with Scientific Methods in Learning Development

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Abstract

The use of scientific methods in learning is used as an identification of the application of the Academic Success Skills. This study aims to look at Academic Success Skills Indicators in planned learning through learning planning. This is done using self-evaluation of educators. The assessment given is divided into four indicators such as Collaboration; Effort, Motivation, Persistence; Meta-cognitive; and Intellectual Risk Taking. These indicators are assessed to ensure the achievement of learning objectives directed at graduates who have the Success Skills Academics. The results obtained show that the indicator that has the highest to smallest value in a row in planning is Intellectual Risk Taking; Effort, Motivation, Persistence; Collaboration; and Meta-cognitive.

Keywords: *Scientifics Methods, Academic Success Skill, Development, Learning*

1. Introduction

Learning with the scientific method becomes popular and is directed as the basis for learning in the classroom. This is aimed at the basic achievement of every graduate at Universitas Negeri Medan in order to have scientific competence. Graduates who have these abilities can be identified through ways of thinking, acting, making decisions, and socializing. The scientific method used has become the basis and developed in learning (Bonilla, 2000; Enoch, 2005; Karsai & Kampis, 2010). The advantages of the scientific method in learning are the basis for its use in learning.

Learning with the scientific method not only provides training in thinking skills but also in skills and decision making. Improvement of learning that applies the scientific method shows the results of an increase in the learning outcomes of students through the stages of learning (Bonilla, 2000; Buaraphan, 2010; Enoch, 2005; Guy, 2001; Karsai & Kampis, 2010). Various methods are combined in learning with the aim of optimizing the use of scientific methods in learning to achieve optimal graduate outcomes. Besides combining several methods in learning, the scientific method is also applied with the use of learning media. Many learning models apply scientific methods to implementation activities as a basis for development and achievement of learning outcomes in the form of high-level thinking skills and abilities.

Based on this, a lot of research applies in the development of learning tools and learning aids to improve learning outcomes that are learning objectives (Harahap & Sinuraya, (2013); Sinuraya & Siburian, (2013); Harahap & Sinuraya, (2014); Sinuraya, Motlan, & Ratelit, (2012); Sinuraya, Simatupang, & Wahyuni, (2014)). The development of learning tools and learning activities that apply the scientific method is considered more effective at the achievement of learning objectives (Andrew & James, 2016; Buaraphan, 2010; Kwah, Milne, Tsai, Goldman, & Plass, 2016; Navorsing et al., 2006).

The learning objectives designed are intended to produce graduates who are able to compete with current developments. Learning outcomes that you want to achieve not only in certain thinking skills and skills but also require skills to be able to succeed academically and socially. The skills in question are Academic Success Skills that can be used to achieve academic and performance success. Academic Success Skills are skills with Collaboration indicators; Effort, Motivation, Persistence; Meta-cognitive; and Intellectual Risk-Taking (Montgomery County Public School, 2010). These four indicators are not only in the realm of development that students need but the three domains in learning outcomes of students. Academics Success Skills is the basis for learning achievement because several studies in developing countries show progress in using the Academic Success Skills (Counselor & Services, 2007; Ivan & Duduciuc, 2011; Morgan, Saunders, & Shrem, 2013; Solberg, Davis, & Mclemore, 2010; Wright, 2012). This is the basis for consideration to be able to apply these abilities as a turning point in the development of learning in producing competent graduates.

Collaboration is the basis for the social development of students in finding and producing solutions from submitting problems through consideration of other groups for the suitability of decisions with other groups (Figueiró, Bittencourt, & Schutel, 2016; Herro, Quigley, Andrews, & Delacruz, 2017; Sinuraya & Wahyuni, 2018). Collaboration teaches to be able to collaborate with other groups and learn in accepting opinions through appropriate considerations of evidence and logic of thinking from various parties. This is what can form a strong character in socializing to solve the problems given.

Motivation as a basis for mental self-development can strengthen the desire in learning as an effort in the self to continue to be able to develop abilities despite obstacles and obstacles in the learning process. The use of motivation in learning is very effective as a determinant of stability in learning both intrinsically and extrinsically to remain in the goal of the expected learning achievement. In addition, motivation can be a struggle that students have in achieving learning goals (Baeten, Dochy, & Struyven, 2013; Depasque & Tricomi, 2015; Mustapha, 2014; Sinuraya & Wahyuni, 2018). Motivation is also needed in the world of work and other things in life as a basis for mental formation and personality. Some studies show the successful use of motivation in learning and daily activities in life.

Meta-cognitive or Meta-cognition is the ability possessed in the thinking process. Meta-cognitive is used to be used as a consideration in drawing conclusions and considerations from an action or decision made as a result of learning. This ability makes students able to think in conditions that are not possible to be things that need to be considered in drawing conclusions or decisions made through consideration of risks and benefits. Students who are trained meta-cognitively will be able to consider everything through evidence or possibilities that will occur so as to create opportunities and achieve success (Carol, 2003; Hamilton-giachritsis, Banakou, & Quiroga, 2018; Ndethiu, 2017).

In addition to meta-cognitive indicators that show skills in thinking are Intellectual Risk Taking. Intellectual Risk Taking is the ability to consider a situation and make decisions in circumstances that are not possible. This is necessary to be able to consider all the possibilities that can be achieved or impossible (Furnham, 2017; Hamilton-giachritsis et al., 2018; Menestrel & Rode, 2014; Schweitzer & Gibson, 2008). The successful use of Intellectual Risk Taking in research indicated the presence of factors for planned achievement in decision making and action planning based on facts and possibilities that exist logically and scientifically.

2. Method

In this study conducted by using self-evaluation of educators. The assessment given is divided into four indicators such as Collaboration; Effort, Motivation, Persistence; Meta-cognitive; and Intellectual Risk Taking. This is aimed at the learning device planning system as the rationale for expected graduate achievement. This is done to be used as basic information for developing learning tools through descriptive research on the development of learning at Universitas Negeri Medan. The data obtained is in the form of the total of each indicator and the average value of the indicator being assessed. This can show how the distribution of device development is produced by each educator.

3. Result & Discussion

The academic success skills indicators that are frequently used in the development of learning devices are consecutively: Intellectual Risk Taking; Effort, Motivation, Persistence; Collaboration; and Meta-cognitive (Figure 1). Learning tools that are assessed as learning tools at the University level. The learning achievement that the majority of students want to achieve in their ability to think both personally and socially is in accordance with the highest level of indicators in Intellectual Risk-Taking.
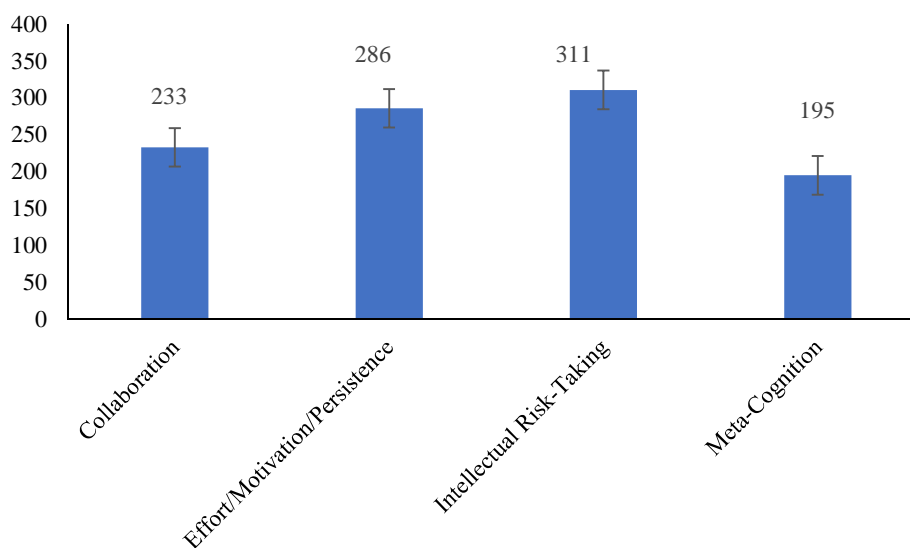
Figure 1. Total Score of Academics Success Skills Indicators

In addition, Figure 1 also shows that Meta-cognitive is an indicator that has not gained attention for improving the planned learning plans. However, from the average value of Meta-cognitive, it remains a reference in the development of learning planning that is produced even though it is still low compared to other indicators (Baeten et al., 2013; Depasque & Tricomi, 2015; Ivan & Duduciuc, 2011; Peffer, Beckler, Schunn, Renken, & Revak, 2015; Solberg et al., 2010).

Planning the development of learning tools produced is still dominant in cognitive versus skills. This is because at the University level students are more dominant in developing thinking skills than skills (Furnham, 2017; Hamilton-giachritsis et al., 2018; Menestrel & Rode, 2014; Schweitzer & Gibson, 2008). Some studies show that although cognitive is the basis for improving learning outcomes (Andrew & James, 2016; Bonilla, 2000; Buaraphan, 2010; Enoch, 2005; Guy, 2001; Karsai & Kampis, 2010; Kwah et al., 2016), the thinking ability developed has been a high-level thinking ability in problem-solving and submission of solutions that can be assessed through social processes of personality formation through motivation and Persistence. In addition, several studies show how important indicators of collaboration are in learning where at present the collaboration system and persistence are indispensable to keep trying to achieve results and are in line with students' meta-cognitive improvement (Andrew & James, 2016; Bonilla, 2000; Buaraphan, 2010; Counselor & Services, 2007; Hamilton-giachritsis et al., 2018; Ivan & Duduciuc, 2011; Morgan et al., 2013; Peffer et al., 2015).

4. Conclusion and Recommendation

From the research it can be concluded that the development of indicator learning tools that are more applied in the development of learning devices in a row is Intellectual Risk Taking; Effort, Motivation, Persistence; Collaboration; and Meta-cognitive. Indicators that are still considered low on Meta-cognitive indicators. This is because it is still centered on the other three indicators. From the results of this study, it is suggested to developers of learning devices to be able to adjust the four indicators at the same level in achieving Academic Success Skills as learning outcomes in improving the quality and competence of graduates.

References

Andrew, K. R., & James, D. (2016). Engaging Preservice Teachers in Context-based , Action-oriented Curriculum Development.

Baeten, M., Dochy, F., & Struyven, K. (2013). The effects of different learning environments on students ' motivation for learning and their achievement, 484–501. https://doi.org/10.1111/j.2044-8279.2012.02076.x

Bonilla, J. P. Z. (2000). Truthlikeness, rationality and scientific method ∗, (1986), 321–335.

Buaraphan, K. (2010). Pre-service and In-service Science Teachers ' Conceptions of the Nature of Science.

Carol, T. (2003). Cognitive , Academic , and Attitudinal Predictors of the Grade Point ...

Counselor, S., & Services, S. S. (2007). Academic Success Strategies for Students With Disabilities Students With Disabilities :

Depasque, S., & Tricomi, E. (2015). NeuroImage Effects of intrinsic motivation on feedback processing during learning. *NeuroImage*, *119*, 175–186. https://doi.org/10.1016/j.neuroimage.2015.06.046

Enoch, I. (2005). THE SCIENTIFIC METHOD AND OTHER BASES FOR EVALUATION PROCEDURES : A REVIEW OF.

Figueiró, P. S., Bittencourt, B. A., & Schutel, S. (2016). Education for sustainability in business schools by practicing social learning. *Brazilian Journal of Science and Technology*. https://doi.org/10.1186/s40552-016-0014-7

Furnham, A. (2017). Sex Differences in Self-Estimated Intelligence , Competitiveness and Risk-Taking, 109–112.

Guy, R. (2001). Teaching & amp ; learning the scientific method.

Hamilton-giachritsis, C., Banakou, D., & Quiroga, M. G. (2018). Reducing risk and improving maternal perspective-taking and empathy using virtual embodiment. *Scientific Reports*, (July 2017), 1–11. https://doi.org/10.1038/s41598-018-21036-2

Harahap, A. R., & Sinuraya, J. (2014). Pengaruh Model Pembelajaran Inkuiri Terhadap Hasil Belajar Siswa Pada Materi Pokok Listrik Dinamis Di Kelas X SMA Swasta Al Ulum Medan T.P. 2013/2014. *Jurnal Inpafi, 2* (3), 1-10.

Harahap, F., & Sinuraya, J. (2013). Pengaruh Model Pembelajaran Inquiry Training Terhadap Hasil Belajar Siswa Pada Materi Pokok Suhu dan Pengukuran Kelas VII Semester I MTs N 2 Medan T.P 2012/2013. *Jurnal Inpafi, 1* (1), 34-40.

Herro, D., Quigley, C., Andrews, J., & Delacruz, G. (2017). Co-Measure : developing an assessment for student collaboration in STEAM activities. https://doi.org/10.1186/s40594-017-0094-z

Ivan, L., & Duduciuc, A. (2011). Social skills , nonverbal sensitivity and academic success . The key role of centrality in student networks for higher grades achievement, *3410*.

Karsai, I., & Kampis, G. (2010). The Crossroads between Biology and Mathematics : The Scientific Method as the Basics of Scientific Literacy, *60*(8), 632–638. https://doi.org/10.1525/bio.2010.60.8.9

Kwah, H., Milne, C., Tsai, T., Goldman, R., & Plass, J. L. (2016). development of an afterschool game design curriculum. *Cultural Studies of Science Education*, 713–740. https://doi.org/10.1007/s11422-014-9621-0

Menestrel, L., & Rode, J. (2014). Enriching Intergenerational Decision-Making with Guided Visualization Exercises, 675–680. https://doi.org/10.1007/s10551-013-1786-z

Montgomery County Public School, (2010). Overview of Critical Thinking, Creative Thinking, and Academic Success Skills.

Morgan, M. C., Saunders, B., & Shrem, J. (2013). Academic Libraries : Essential to Student Success in an Ever Changing World Academic Libraries : Essential to Student Success in an, (November), 1–28.

Mustapha, B. (2014). ATTITUDES AND MOTIVATIONS IN LEARNING ENGLISH AS A FOREIGN LANGAUGE, *07*(03), 117–128.

Navorsing, O., Ankiewicz, P., Education, T., Africa, S., Ankiewicz, P., Park, A., & Africa, S. (2006). ' n Teoretiese besinning oor die implikasies van die filosofie van tegnologie vir kriteria vir vakkurrikulumontwikkeling en -evaluering. https://doi.org/10.4102/satnt.v34i1.1170

Ndethiu, S. M. (2017). META-COGNITION AND GRADUATE ATTRIBUTES ' DEVELOPMENT : ENGINEERING STUDENTS ' REFLECTIONS ON THEIR STRENGTHS , WEAKNESSES AND STRATEGIES, *10*(01), 329–338.

Peffer, M. E., Beckler, M. L., Schunn, C., Renken, M., & Revak, A. (2015). Science Classroom Inquiry (SCI) Simulations : A Novel Method to Scaffold Science Learning, 1–15. https://doi.org/10.1371/journal.pone.0120638

Schweitzer, M. E., & Gibson, D. E. (2008). Fairness , Feelings , and Ethical Decision- Making : Consequences of Violating Community Standards of Fairness, 287–301. https://doi.org/10.1007/s10551-007-9350-3

Sinuraya, J., & Siburian, L. M. (2013). Pengaruh Penerapan Strategi Inkuiri Terhadap Hasil Belajar Siswa Pada Materi Pokok Zat dan Wujudnya Di SMP Santo Yoseph Medan. *Jurnal Penelitian Bidang Pendidikan, 19* (1), 37-43.

Sinuraya, J., & Wahyuni, I. (2018). Relationship Analysis ICARE-Oriented Students Worksheet Development With Learning Styles To Improve Learning Outcomes, *5*(9), 324–331.

Sinuraya, J., Motlan, & Ratelit, T. (2012). Inovasi Strategi Pembelajaran Berbasis Metode Inkuiri dan Blended Learning Prodi Pendidikan Fisika FMIPA UNIVERSITAS NEGERI MEDAN. *Jurnal Online Pendidikan Fisika, 1* (1), 17-25.

Sinuraya, J., Simatupang, S., & Wahyuni, I. (2014). Pengembangan Perangkat Pembelajaran Berbasis Masalah Untuk Peningkatan Capaian Kompetensi Fisika Umum II Mahasiswa Prodi Pendidikan Fisika FMIPA Universitas Negeri Medan. *Jurnal Pendidikan Fisika, 3* (1), 24-33.

Solberg, V. S. H., Davis, A., & Mclemore, C. (2010). Resiliency as an Indicator of Academic Success Examining Success Highways [TM] Resiliency Assessments as DQ Indicator of Academic Success.

Wright, J. (2012). The Academic Enabling Skills : Interventions for Middle and High School Students ' Academic Enabler ' Observational Checklists : Measuring Students '.