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Training Scenario Development on Environmental Education Using the STSE Model to Improve Positive Attitudes of Prospective Early Childhood Education Teachers Towards the Environment

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ABSTRACT

The purpose of this research is to develop training scenarios on environmental education using Science, Technology, Society, Environment (STSE) model integrated into scientific thematic lessons, particularly for prospective early childhood teachers. In addition, product efficiency on the positive attitudes of the trainers towards the environment was examined. The above-mentioned objectives are possibly achieved with the following activities: 1) initializing the Borg & Gall model (2019:67-77) and 2) assessing the resulting product value using t-test, termed pre-test and post-test. Therefore, the applied simulations were declared suitable for use after series of developmental events. The results involved three expert assessments in the field of early childhood, environmental education, and educational technology, although further analysis is required. Subsequent investigation conducted on the subject user group, indicating a positive value of 83.3%, in support of the product. Therefore, the efficiency test results showed the training on environmental education using the Environmental Education Training with Science-Technology-Society-Enviroment (STSE) model and integrated with scientific thematic lessons, were known to enhance 32.44% of all aspects of the prospective teacher's positive attitudes on the environment.

KEY WORDS
training; environment; education; attitude; environment

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INTRODUCTION

Currently, severe damage to the environment appears to be a disturbing situation, due to inadequate display of positive mentality. This is probably attributed to the pathetic appreciation of environmental education. One possible approach to overcome this challenge is to train prospective early childhood teachers to inculcate constructive behavior towards the environment from a very young age. As a result, a community of positive-minded individuals campaigning for sustainable development is assumed to emerge. Moreover, the orientation for elementary teachers is enhanced by modifying early childhood curriculum, through incorporating Childhood Education Teachers Programs in academic courses, and also providing stand-alone trainings as alternatives due to effective and direct implementation. (Wicker, 2009;45)

The Science-Technology-Society-Environment (STSE) model essentially provides an understanding of the relationship between science technology and society, training the sensitivity of individual assessments of environmental impacts as a result of the development of science and technology. According to Binadja (1999), decisions made by society usually require the use of technology to carry them out. In fact, society and science use technology as a means to store information. The important role that technology has can serve as a means of action and investigation in the Science-Technology-Society-Environment (STSE) model. Data also implies the nature of science as a field in all societies.

The Science-Technology-Society-Environment (STSE) model or often also called the Science-Environment-Technology-Society (SETS) is aimed at helping individuals know science, its development and how the development of science can affect the environment, technology and society reciprocally. This model can at least open up individual insights about the nature of Science, environment, technology, and society education or Science-Technology-Society-Environment (STSE) as a whole (Binadja, 1999).

According to Aikendead (1992), the Science-Technology-Society-Environment (STSE) model can connect the real-world life of an individual as a member of society with the classroom as a science learning space. The learning process that uses this model can provide a learning experience for individuals in identifying potential problems, collecting data related to problems, considering alternative solutions, and considering consequences based on certain decisions.

Science-Technology-Society-Environment (STSE) model as an alternative to improve activities, motivation and learning outcomes. According to Coyle (2014) Science or knowledge is defined as a series of interconnected concepts that are developed from the results of experiments and observations and correspond to subsequent experiments and observations. The environment is a place for living activities. Technology is the entire effort made by the community to hold objects to provide comfort for themselves, while society or society is a social social environment and the rules adopted by a community group.

According to Binadja (2019), the Science-Technology-Society Environment (STSE) model is a learning that relates its four elements, namely science, technology, the environment, and society in learning. The subject matter is associated with concrete examples related to the society around the individual that are often encountered in everyday life, so it is easy to understand the material.

Still according to Binadja (2019) learning with the Science-Technology-Society-Environment (STSE) model offers the advantage of forming individuals who have reasoning abilities and conclusive thinking when individuals are faced with a problem to be solved. In Science-Technology-Society-Environment (STSE) learning, students and teachers who get teaching both have a decisive role in achieving learning objectives. The role of the teacher creates a mindset that invites seeing the future with its various implications, brings students to always think integratedly, invites students to think critically in facing things with the Science-Technology-Society-Environment (STSE) model.

By paying attention to the above, an effort is needed to improve the attitude of prospective Early Childhood Education Teachers Programs teachers towards the environment, because by increasing the ability of prospective Early Childhood Education Teachers Programs teachers to the environment, it is hoped that later when they carry out their duties as teachers in Early Childhood Education Teachers Programs they will be able to provide teaching about the environment correctly and the hope is that the students taught also have an attitude and concern for the environment.

There are several ways that are quite effective for teaching environmental education in Early Childhood Education Teacher Education Study Program, including: First, compiling a curriculum for environmental education courses that are taught directly to Early Childhood Education Teacher Education Study Program students, Second, by integrating environmental education with Creativity and Development courses or Science in Early Childhood Education Teacher Education Study Program which are taught directly to students. Third, organizing environmental education specifically in the form of training for prospective teachers. The three alternatives mentioned above each have less and more values. If the curriculum preparation is carried out in environmental education courses that will be taught to Early Childhood Education Teacher Education Study Program students, it takes a long time and the preparation process, although the results will be able to be used permanently at the Early Childhood Education Teacher Education Study Program institution.

For the second alternative by integrating environmental education in the course of Creativity and Its Development or Science in Early Childhood Education Teacher Education Study Program, this is less effective because it has to create a new curriculum and change the existing curriculum, namely making a new curriculum of Creativity and Development or Science in Early Childhood Education Teacher Education Study Program that is integrated with environmental education or changing the curriculum of Creativity and Development or Science in Early Childhood Education Teacher Education Study Program that already exists with the content of environmental education and this requires quite a long process. While the implementation of activities by using the third alternative, namely by conducting training, this does not take a long time because training sessions can be carried out outside of lectures and do not require an supporting process in the preparation of an environmental education curriculum that is integrated with certain lessons or making a separate curriculum for environmental education, but this training activity is only a momentary nature and cannot be used continuously in the Early Childhood Education Teacher Education Study Program.

In order to obtain the desired results from the environmental education pattern described above, a model is needed to be tested so that the

effectiveness of environmental education activities can be known that is able to cultivate individual attitudes, especially prospective teachers towards the environment. As a first step, given the limited time, it is necessary to compile a Science-Technology-Society-Environment (STSE) model on environmental education training for prospective teachers or students of Early Childhood Education Teacher Education Study Program with the aim that when working as teachers have skills and understanding of the environment and have an attitude of concern for their environment, and when carrying out lectures they better understand environmental education comprehensively even though it is integrated in relevant subjects such as the course of Creativity and Its Development or Science in EARLY CHILDHOOD.

The underlying thing is why use Creativity and Its Development or Science in ECCE as a forum for the integration of environmental education? Science in Early Childhood Education Teacher Education Study Program is taken because Science in Early Childhood Education Teacher Education Study Program is essentially an effort to understand, awareness, and develop positive values about the nature of science through learning. Science in Early Childhood Education Teacher Education Study Program is essentially the science and knowledge of natural phenomena that include products and processes.

Sikula (2010: 67) reported the three objectives of training as 1) developing expertise, therefore work can be completed quickly and more effectively, 2) developing knowledge, therefore work can be resolved rationally, and 3) developing attitudes, such that there can be cooperation between the employees and the management. Also, Buckley (2011: 143) revealed that the purpose of training is for an individual in a work situations to be able to do certain tasks or jobs satisfactorily.

There are steps commonly used in developing training programs as outlined by William (2010: 290). These principally include, a) analysis or assessment of needs, b) creation of training and development objectives, c) program content, d) principles learning, e) program implementation, f) expertise, knowledge and ability of workers, and g) evaluation. And according to Sikula (2010: 67), training methodology is a strategy used to achieve the objectives of the training curriculum. And that the three most important things to be considered in training methodology are the training planning, training methods and training media.

The final product is a "Science-Technology-Society-Environment (STSE) model on environmental education training through Science lessons to improve the attitudes of prospective ECCE teachers towards the environment". With the hope that the future teacher when teaching he will be able to cultivate students' attitudes towards the environment.

This environmental education training technique uses the Science-Technology-Society-Environment (STSE) model because currently this model is quite effectively used for environmental education which is integrated with Science lessons at the early childhood education level as stated by Mansour (2010). Based on this, the developer wants to further develop a Science-Technology-Society-Environment (STSE) model on environmental education training by integrating science lessons in ECCE through various existing themes integrated in the science-based Learning Plan.

This development model is outlined in the Science-Technology-Society-Environment (STSE) model book on environmental education training through science lessons to improve the attitudes

of ECCE teacher candidates towards the environment, which consists of the STSE Model Book for Environmental Education Training whose content is about Training Guidelines with the Science-Technology-Society-Environment (STSE) model with An Appendix to the Training Materials.

The model developed is the only Science-Technology-Society-Environment (STSE) model used as a technique in environmental education training that is integrated with thematic learning with scientific concepts. With this developed model, prospective teachers have the ability to view things in an integrated manner by paying attention to the four elements of the Science-Technology-Society-Environment (STSE) model, so that they can gain a deeper understanding of the knowledge they already have and can be applied in developing environmental attitudes towards

RESEARCH METHOD

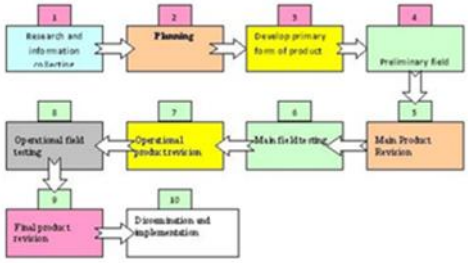
This study was conducted at the PAUD Lenterahati Institution West Lombok Islamic Boarding School West Nusa Tenggara Barat. It is a development research which is a type of descriptive qualitative study. The data were collected by the triangulation or combined technique. And upon analysis of the data, the results emphasize the meaning of generalization.

The steps taken in this development research are shown in Figure 1, consisting of Stage 1 to 7, starting with data collection, model formation and then its implementation through pre-testing and post-testing.

Borg & Gall (2019:67-77) model was applied to develop the product, and the effectiveness was analyzed using t-test, termed pre-test and post-test. The development processes include: 1) preliminary research and data collection, 2) planning, 3) sample design, 4) primary field testing, 5) initial product revision, 6) further field testing and 7) operational product review. However, 8) operational testing, 9) final product revision, and 10) dissemination, were not employed due to certain adjustment to the needs, time, and objectives, this is because of time constraints and this research is only limited to product testing and not up to dissemination. Furthermore, effectiveness experiment was used to determine the product utility in order to increase the positive attitude.

The analysis of the development results based on expert and user group assessments were provided. The specialist's category includes: utility, feasibility, and accuracy. These were performed in the fields of early childhood, environmental education, and educational technology, with the processing of qualitative and quantitative data. Subsequently, the user group was involved with undergraduate students of early childhood education major, through closed interviews and specifying written suggestions on: 1) product contents, 2) writing systematics, 3) layout, and 4) follow-up obtained from the processed data.

Figure 1. Adopting Development Research Flow. Theory Research and Development Borg and Gall.1.



RESULT

A. Analysis of Expert Assessment

Quantitative Data; According to the expert for the development of the Science-

Technology-Society-Environment (STSE) model , the accuracy and usability aspects are classified as very accurate and very useful. Likewise, the feasibility aspect is classified as very feasible and feasible. Also, the user test results are classified as very accurate and accurate for accuracy, very useful and useful in the aspect of usability and then feasible for the feasibility aspects. Then the next step is to improve based on the advice provided by experts and users. The stages of improvement are: (a) Improvement on the advice based on quantitative values on the assessment instrument, There are no stages of improvement based on these because the results of evaluations from experts and users on usability, accuracy and feasibility are very useful, very accurate and very feasible. (b) Improvement on the advice based on qualitative values are suggestions and notes provided by experts and users.

Based on the expert's advice ; Experts I and II did not provide suggestions for improvement but Expert III did: (a) material in PowerPoint should be more interesting and have a better format, (b) material for implementing activities should always come with introduction, main activities and closing, (c) assignments might be attached as Material 3, (d) at the end of work there should be materials for conclusions, reflections and questions as tasks, (e) there should be material for final evaluation which could be tests, interviews or questions and work products, (f) literature needs to be added to its revisions, and (g) media should be more varied. And all the improvements have been completed according to the expert advice.

Based on user's advice; All the three users did not provide suggestions and input for improvement. The only advice given was in aspect of appreciation, hope and utilization of the developed PMB model, which bothers on the fact that the Science-Technology-Society-Environment (STSE) model model was very useful for teachers in increasing their achievement motivation, could be used as a guide or reference in training achievement motivation and that the model is very feasible when it comes to developing the teachers.

Development of Science-Technology-Society-Environment (STSE) model s for teachers in improving achievement motivation. The analysis of the activity process was reviewed from each aspect of achievement motivation and effectiveness of the Science-Technology-Society-Environment (STSE) model model. This sub-focus description includes: (a) analysis of the activity process in each aspect of achievement motivation, and (b) the effectiveness test analysis of the Science-Technology-Society-Environment (STSE) model model. Results from Assessment of each Aspect;

Table 1**.** The Percentage of Improvement on each Aspect

Aspect		Pretest	Posttest	Improvem
1st aspect	Have a high level of personal responsibility	40%	96%	56%
2nd aspect	Dare to take and carry on the risk	44%	96%	53%
3rd aspect	Have realistic goals	43%	95%	51%
4th aspect	Have a comprehensive work plan and strive to realize goals.	44%	96%	53%
5th aspect	Utilize of concrete feedback in all activities carried out.	40%	96%	56%
6th aspect	Look for opportunities to realize a programmed plan.	44%	96%	52%

This data was obtained from expert assessment using questionnaires. Also, the analysis includes: utility, feasibility, and accuracy, as conducted by three professionals of early childhood, environmental education, and educational technology. The results originated from the examination of utility, feasibility and accuracy on training scenarios on environmental education using Environmental Education Training with Science-Technology-Society-Enviroment model integrated into scientific thematic lessons. However, further use and development are possible.

These provisions are therefore, employed to train prospective teachers

(undergraduate students of early childhood education) to exhibit positive behaviors towards sustaining the environment using Natural Sciences (IPA) learning approach.

Qualitative Data; This data was obtained from input or opinions of experts after careful study of the training scenario draft. Expert I (Early Childhood Education) The specialist expressed certain dominant ideas and suggestions, including: 1) adequate use of training brochure for prospective teachers in developing learning tools by integrating environmental education into scientific thematic lessons and STSE model, 2) to facilitate simple comprehension, the book provided several illustration based on the presented material. 3) the integration method appeared practical and easy to follow, 4) lesson plans and concrete examples were included in order to enhance comprehension.

In terms of feasibility, early childhood education expert stated the training scenario on environmental education with STSE model, is already sufficient for application. This is captured in a comprehensive discussion between various materials in the publication. Furthermore, in terms of accuracy, the document was considered significant and appropriate for prospective teachers, although there is need to cater for elementary school.

Expert II (Environmental Education); The expert was handed the training scenario draft and within of 2 weeks to study, was able to provide significant contributions as follows: 1) there was no clarity of concept in order to ascertain the level of accepted for low or high class, 2) models and materials are based on studies or learning experiences of elementary school, and 3) theme or topics of environmental education are expected to be more specific.

Based on the suggestions and main concepts, efforts at improving the draft are in accordance with provisions from the professionals. Expert III (Educational Technology Expert)

The consultant was provided with corrective input on the draft guidebook and training materials, with specified appreciation. Also, certain opinions are deemed urgent based on expert's submission, including: 1). In the manual, the specific objectives to achieve through the training are clearly outlined, 2) pictures are required to facilitate action in each stage, 3) from a technical perspective, the cover design, both in the guidebook and the material, is expected to contain 3 - 4 images, and presented in enlarged format depending on the page, 4) book titles at home appear as a guidebook and material put together, and not barely as attachment, 5) the need to pay careful attention to consistency in terms of using upper and lower case letters, particularly in the book , and 6) layouts are considered, therefore lesser pictures are extended, especially for the cover.

Apart from the above suggestions, experts appreciate the benefits of the book, including: 1) the value for prospective teachers as a breakthrough in training systems using *Environmental Education Training with Science-Technology-Society-Enviroment (STSE)* approach, 2) appropriate for use due to simpler language and easily comprehended contents, and 3) sufficiency in terms of presentation.

B. User Group Test Analysis

Quantitative Data; The analysis result conducted by the user group subjects was specified at 83.3%, and was declared suitable to the product. In addition, the assessments were described as follows:

Table ; 2

Tabulation of the field test interviews results

Description	Sb 1	Sb 2	Sb 3	Sb 4	Sb 5	Sb 6
The number of yes answers	5	4	5	5	5	6
The number of no answers	1	2	1	1	1	0
The total yes answer	*30 = 83.3 %*					
The total no answer	*6 = 16.7 %*					
Total Answers	*36*					

Description: Sb = subject

Based on the above table, the subjects generally offered **yes** answers up to 30 or 83.3%. This denotes several respondents agreed, understood and stated the product as useful. Meanwhile, the **no** outcomes were barely 6 or 16.7% of the total 36 responses.

Specifically, the results are described as follows: a) Is this product easy to understand? A total of 6 respondents answered yes. 2) Is this product useful to prospective teachers? Out of 6 respondents, only 1 provided a no. This shows the other 5 stated the draft was considered quite significant. 3) Is this training product important to apply in order to increase the prospective teacher's knowledge on environmental education? This question was responded with 6 yes answers, indicating absolute agreement. 4) Can environmental education be integrated into scientific thematic lessons in elementary schools? This question was responded with 6 yes, therefore the total number were in support., 5) Do you understand the *Environmental Education Training with Science-Technology-Society-Enviroment (STSE)* concept? The respondents did not actually comprehend the concept, as observed from the reactions. However, out of 6 submissions, only one selected yes (understand), while the remaining 5 said no. and 6) Do teachers need to acquire special education, in order to train students on integrated science lesson model of environmental education with *Environmental Education Training with Science-Technology-Society-Enviroment (STSE)* model? Overall, the respondents specified yes.

C. The Results of Product Effectiveness Test

The effectiveness test result is believed to be the success of training on environmental education, using the *Environmental Education Training with Science-Technology-Society-Enviroment (STSE)* model integrated into scientific thematic lessons, as observed in the increase of average score from 2.80 to 3.71, or by 32.44%. This implies the training on environmental education using *Environmental Education Training with Science-Technology-Society-Enviroment (STSE)* model, and integrated with scientific thematic lessons, is significant in enhancing positive attitudes of prospective early Childhood teachers towards the environment. Specifically, the results are described as follows (according to the instrument developed by Harlen (1993), termed: 1) the training tends to advance by 21.95% in terms of concern for prospective teachers towards the environment, 2) an increase by 36.40% based on appreciation 3) the inclination by 34.94% in terms of prospective teacher's responsibility towards the environment, and 4) the training enhanced 37.69% of the prospective teacher's attitudes to protect the environment, 5) the capacity to expand 32.44% of all positive attitudes aspects on prospective early childhood teachers.

CONCLUSION

This research has been able to produce an Science-Technology-Society-Environment (STSE) model for teachers with test series of expert and users to find out its validity and effectiveness. The model is used to train and increase in the teacher's positive attitude towards the environment. By increasing positive attitudes with the production of a Science-Technology-Society-Environment (STSE) model that has been compiled,

this is certainly beneficial for teachers so that teachers are able to apply in environmental education packaged with learning in the classroom or outside the classroom.

Based on the results of the above conclusions, necessary recommendations were provided, including: 1) the need to expand the implementation of model to match with the activities of elementary school teachers. This is possibly conducted using *LPMP* (Educational Quality Assurance Agency) or the Local Education Office in collaboration with Higher Education, 2) The model developed through this training was unable to guarantee continuity/follow-up as a result of existing outside confines of the lecture system. Therefore, there is need to develop the environmental education concept in Bachelor of Early Childhood Education by adopting an environmental education training model using *Science-Technology-Society-Enviroment* approach, and integrating scientific thematic lessons into the curriculum, and 3) the development is only limited to testing changes in attitudes towards prospective teachers or training participants. Therefore, further extension is recommended on the ability of training system both in service or through outside lectures to measure changes in attitudes towards the environment in students after teachers are adequately trained.

REFERENCES

Ben-Zvi, O. & Orion, N., Development of system thinking skills in the context of earth system education, Journal of Research Science Teaching, 42(5), 518-560, 2015.

Borg, W. D. & Gall, MD. 2019. *Educational Research: An Introduction*. New York : Longman

Eneji, C.; Akpo, D.; Edung, E. Historical Groundwork of Environmental Education (Fundamentals and Foundation of Environmental Education). Int. J. Contin. Educ. Dev. Stud. 2017, 3, 110–123.

Flogaiti, E. Education for the Environment and Sustainability, 2nd ed.; Pedio: Athens, Greece, 2011.

Goldman, D.; Yavetz, B.; Pe'er, S. Environmental Literacy in Teacher Training in Israel: Environmental Behavior of New Students. J. Environ. Educ. 2006, 38, 3–24. [CrossRef]

Goleman, D. 2009. Ecological Intelligence-How Knowing the Hidden Impacts of What We Buy can Change Everything, Broadway Books, The Crown Publishing Groups

Gunningham, N.; Kagan, R.A.; Thornton, D. Social license and environmental protection: Why businesses go beyond compliance. Corp. Environ. Responsib. 2017, 29, 485–519. [CrossRef]

Kamen, M. Editorial: Do we need more science education research?, Electronic Journal of Science Education, 15, 2, 2011

Karageorgakis, S. Environment. Philosophy and Environmental Education; Eftopia Publications: Athens, Greece, 2016.

Keraf, A.S. 2002. Etika Lingkungan. Jakarta : Penerbit Buku Kompas.

Kirkpatrick, D.J. 1994. Evaluating Training Program: The Four Level. San Francisco: Berret Koehler Publishing, Inc.

KLH. 2005. Data lingkungan hidup, (http://www.menlh.go.id/), diakses pada tanggal 17 Februari 2012

KLH. 2009. Data lingkungan hidup, (http://www.menlh.go.id/) diakses pada tanggal 17 Februari 2012

KLH. 2010. Agenda 21 Indonesia, 2010. Strategi Nasional untuk Pembangunan Berkelanjutan. Jakarta: Kantor Menteri Negara Lingkungan Hidup

Kruglanski, A.W.; Higgins, E.T. Social Psychology: Handbook of Basic Principles, 2nd ed.; Guilford Press: New York, NY, USA, 2007.

Laws, D., Scholz, R., Shiroyama, H., Susskind, L., Suzuki, T. & Weber O., Expert Views on Sustainability and Technology Implementation, International Journal of Sustainable Development in World Ecology, 11(3), 247-261, 2004

Levy Nahum, T., Azaiza, I., Kortam, N., Ben-Chaim, D., Herscovitz, O. & Zoller, U., "Does STES-Oriented Science Education Promote 10th-Grade Students' Decision Capability?", International Journal of Science Education, 32(10), 1315-1336, 2010.

Pe'er, S.; Goldman, D.; Yavetz, B. Environmental Literacy in Teacher Training: Attitudes, Knowledge, and Environmental Behavior of Beginning Students. J. Environ. Educ. 2007, 39, 45–59. [CrossRef]

Petkou, D. Effects of Mass Media on the Attitudes and Behaviors of Primary Education Teachers on Environmental Matters. Ph.D. Thesis, Department of Forestry and Management of the Environment and Natural Resources, Democritus University of Thrace, Orestiada, Greece, 2017.

Rokicka, E. Attitudes toward Natural Environment. Int. J. Sociol. 2002, 32, 78–90. [CrossRef]

Stamatis, P.; Lazaropoulos, S.; Mastoras, M.; Theodosiadou, P. Educational approaches and methods in Environmental Education. In Proceedings of the 5th Pan-Hellenic Conference of the Hellenic Institute of Applied Pedagogy and Education on "I learn how to learn", Athens, Greece, 7–9 May 2010.

Tal, T., Dori, Y. J., Keiny, S., & Zoller, U., Assessing conceptual change of teachers involved in STES education and curriculum development, e STEMS Project approach, International Journal of Science Education, 23(3), 247-262, 2001

Zolle, Uri. Science, Technology, Environment, Society (STES) Literacy for Sustainability: What Should it Take in Chem/Science Education?/ Journal CHEMISTRY EDUCATION AND SUSTAINABILITY, 207-213, © Universidad Nacional Autónoma de México, ISSN 0187-893-X

Zoller, U., Donn, S., Wild, R. and Beckett, P., "Students' Versus eir Teachers' Beliefs and Positions on Science/Teaching/Society (S/T/S)-Oriented Issues", International Journal of Science Education, 13(1), 25-36, 1991a