

*State University of Makassar*

**INTERNATIONAL CONFERENCE ON MATHEMATICS,  
SCIENCE, TECHNOLOGY, EDUCATION  
AND THEIR APPLICATIONS**

*"Recent Research and Issues on  
Mathematics, Science, Technology, Education  
and their Applications"*

**PROCEEDINGS  
ICMSTFA 2014**

**Makassar, August 20-21, 2014**

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## Conference Proceeding

# INTERNATIONAL CONFERENCE ON MATHEMATICS, SCIENCE, TECHNOLOGY, EDUCATION AND THEIR APPLICATIONS

Makassar, 20<sup>th</sup> – 21<sup>st</sup> August 2014

Recent Research and Issues on Mathematics, Science, Technology,  
Education and Their Applications



**ICMSTEA** 2014

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Faculty of Mathematics and Science  
State University of Makassar



ICMSTEA 2014: RECENT RESEARCH AND ISSUES ON MATHEMATICS,  
SCIENCE, TECHNOLOGY, EDUCATION AND THEIR  
APPLICATIONS

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## Preface

All praise to Allah SWT, because His mercy and blessings, the proceedings of the "International Conference on Recent Research and Issues in Mathematics, Science, Technology, Education and Their Applications (ICMSTEA) 2014" is now finally in our hands. ICMSTEA 2014 was successfully held at Phinisi Building, State University of Makassar on 20<sup>th</sup> – 21<sup>st</sup> August, 2014 and followed 149 parallel speakers and around, around 450 participants in total that registered and participated from many universities in Indonesia and abroad. It is assigned to celebrate the 53<sup>rd</sup> commemoration of State University of Makassar. The conference is organized by the Faculty of Mathematics and Science in conjunction with several committee members from the other faculties within State University of Makassar.

These proceedings are divided into two volumes, the first volume contains all the papers in the field of mathematics education, science education and its applications, and the second volume contains all the papers in the fields of mathematics, science and its applications. We hope that everything contained in these proceedings will expand scientific insights while providing new research ideas and innovations to the conference participants and the reader.

We would like to thanks to the authors for contributing their papers, and the're viewers who have provided assessment and feedback during the editing process. We also would like to thanks to those who have helped the settlement of this proceedings.

We apologize if there are any mistakes in there proceedings. We also would like to express my highest appreciation to the sponsors who have contributed to the successful implementation of ICMSTEA 2014 conference and the publication of these proceedings.

Makassar, August 2014

The Editor Team



### Forewords from the Head of Committee

Assalamu'alaikum Warahmatullahi Wabarakatuh.  
Good morning and may God's blessings be upon us all.

Your Excellency the Rector of State University of Makassar Prof. Dr. H. Arismunandar, M.Pd. Ladies and gentlemen, on behalf of the conference committee, first, I would like to give our welcome to all the delegates, keynote speakers, invited speakers, parallel speakers and participants coming today. Welcome to the conference, welcome to State University of Makassar, and welcome to Makassar.

This conference entitled "*International Conference on Recent Research and Issues in Mathematics, Science, Technology, Education and Their Applications (ICMSTEA) 2014*". It is assigned to celebrate the 53<sup>rd</sup> commemoration of State University of Makassar. The conference is organized by the Faculty of Mathematics and Science in conjunction with several committee members from other faculties within State University of Makassar.

Ladies and gentlemen, the conference proudly invites eleven keynote speakers coming from several countries. Therefore, I would like to express my sincere thanks to the keynote speakers, including:

1. Professor Max Warshauer (Texas State University, USA)
2. Professor Naoki Sato (Kyoto University, Japan)
3. Professor Peter Hubber (Deakin University, Australia)
4. Professor Susie Groves (Deakin University, Australia)
5. Dr. Frans van Galen (Utrecht University, Netherlands)
6. Professor Duangjai Nacapricha (Mahidol University, Thailand)
7. Professor Baharuddin bin Aris (University Teknologi Malaysia, Malaysia)
8. Professor Suratman Woro Suprodjo (Gadjah Mada University, Indonesia)
9. Professor Ismail bin Kailani (Universiti Teknologi Malaysia, Malaysia)
10. Professor Muhammad Arif Tiro (State University of Makassar)
11. Dr. Siti Nuramaliati Prijono (The Indonesian Institute of Science)

I would like also to give sincere thanks and gratitude to the invited speakers, including:

1. Prof. Dr. H. Arismunandar, M.Pd. (State University of Makassar)
2. Prof. Kristian H. Sugiyarto, Ph.D. (State University of Yogyakarta)
3. Prof. Dr. Sutarto Hadi (Lambung Mangkurat University)
4. Dr. Nurdin Noni, M. Hum. (State University of Makassar)
5. Dr. Yuni Sri Rahayu, M.Si. (State University of Surabaya)
6. Dr. Ayuddin M.T. (State University of Gorontalo)
7. Dr. Usman Pagalay (State Islamic University of Malang)
8. Dr. Suyanta, M.Si. (State University of Yogyakarta)
9. Dr. Elisa Sesa, M.Sc. (Tadulako University, Palu)

Next, I want to thanks and welcome to 149 parallel speakers and totally, 450 participants approximately are registered to participate from many universities in Indonesia from Aceh to Papua, and other countries. All of them have shared their research and theoretical papers presented and discussed in the conference.



In this occasion, I would like to thanks to Deputy of Governor of South Sulawesi Province (Ir. H. Agus Arifin Nu'mang, M.Si), Mayor of Makassar City (Ir. H. Ramdhan Dhany Pomanto), Rector of UNM (Prof. Dr. H. Arismunandar, M.Pd.), and Director of Post Graduate Program of UNM (Prof. H. Jasruddin Daud Malago), who are very kind to be the host of welcoming dinner and lunch during the conference.

I want to thanks also to Kalia Group, KIA Kalla, Erlangga Press, Opti Lab, and e-Bimbel Yogyakarta for their contribution as the sponsors of this conference.

Finally, it is my privilege to thanks to all organizing committee members who have been showing good work and determination for the accomplishment of this conference. I would like to apologize to all of you when there are some inconvenience things during the implementation of this conference.

Thank you and wish you have a meaningful conference.

Wassalamu'alaikum Warahmatullahi Wabarakatuh.

Head of Committee,

Suwardi Annas, Ph.D.

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**Forewords from the Dean of Faculty of Mathematics and Science,  
State University of Makassar**

Bismillahirrahmanirrahim  
Assalamu'alaikum Warahmatullahi Wabarakatuh

First of all, let us praise to the Almighty, Allah SWT, because of his Blessings and Helps, we are able to gather here to attend the International Conference on Recent Research and Issues in Mathematics, Science, Technology, Education and Their Applications (ICMSTEA) 2014.

The development of education and technology in recent decades grows very rapidly. In addition, they have been specialized into many specific topics. Indeed, for researchers and lecturers, being qualified of a specific field as well as being aware of the contemporary development of other fields are two crucial things. One of the reasons why we undertake the conference is to fulfill those two things. By attending the conference, researchers and lecturers have a good opportunity to share their research findings and to obtain broader descriptions of the development of other general knowledge.

We convey our deep appreciation and gratitude to all of the committees that work from the beginning to support and organize the conference. We also strongly expect the participants of the conference to be continually productive, increase the capacity in conducting a research, and carry out both national and international scientific publications.

Finally, let me again recite thank you to the all participants of the conference who are receptive to spend their time to be present and entirely involved at this events. I wish the conference advantageous for all of us.

Billahitaufiqwalhidayah,

Wassalamu'alaikum Warahmatullahi Wabarakatuh.

Dean of Faculty of Mathematics and Science  
State University of Makassar

Prof. Dr. H. Hamzah Upu, M.Ed.

## Forewords from Rector of UNM

Bismillahirrahmanirrahim  
Assalamu'alaikum Warahmatullahi Wabarakatuh

Your respectable, the high officials of State University of Makassar, the committee, the speakers, and the participants of conference.

It gives me a great pleasure to extend to you all a very warm welcome, especially to our keynote speakers who have accepted our invitation to attend the conference.

It is an opportune time to convey to you that UNM is celebrating the 53rd Dies Natalis and it commends the faculty of Mathematics and Science (FMIPA) to be in charge of all activity sequences in the Dies Natalis. However, the support of other faculties is also really influential and gives valuable contribution to the success of the event.

In that celebration, we undertake several agendas including educational and sport activities. The conference, ICMSTEA, is one of our educational activities that covers a wide range of very interesting items relating to mathematics, Science, education, technology and their applications.

By taking participation of this seminar, it is highly expected to all of us to share our research findings to society and continuously develop new ideas and knowledge. Those things are two significant steps in improving the quality of nations around the world, increasing our familiarity to each other, and even avoiding underdevelopment.

Furthermore, I would like to take this opportunity to express my heartfelt gratitude to all organizing committee especially for the Faculty of Mathematics and Science that primarily hosts this conference particularly and other Dies Natalis events generally.

Finally, this is a great time for me to declare the official opening of the International Conference on Recent Research and Issues in Mathematics, Science, Technology, Education and Their Applications (ICMSTEA) 2014.

I wish you a very enjoyable stay in Makassar, I warmly welcome you again, as in Makassar, we say "salamakkibatturimangkasara".

Wassalamu'alaikum Warahmatullahi Wabarakatuh.

Rector of State University of Makassar

Prof. Dr. H. Arismunandar, M.Pd.



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## CHALLENGES FACING ECONOMIC EDUCATION IN A FREE TRADE (ACFTA AND AEC)

Muhammad Azis<sup>1</sup>

<sup>1</sup>Faculty of Economic, State University of Makassar,  
Gunung Sari Baru, Sulawesi Selatan, Indonesia.  
e-mail address: azis\_feunm@yahoo.com

### Abstract

Indonesia's participation in free trade both ACFTA (ASEAN-China Free Trade Asia) and the ASEAN Economic Community (AEC) will have an impact not only on the domestic economy but also to the educational institutions. Free trade can bring opportunities and benefits but may be a threat and loss for each country, it is of course highly dependent on the readiness and ability to enter free trade. The challenge and the most fundamental issues facing educational institutions is a matter of the quality of graduates. The era of free trade or globalization era is an era of fierce competition for quality or quality. Development of education should be able to adjust to the changing demands of the local community in a global perspective. Economic education as a field of study or learning at the institutional level should be able to prepare the students as individuals who have the knowledge and attitudes appropriate to the economic development of the era. The purpose of this would be reflected in the curriculum which is operated and structured competency-based graduate economics education subject areas. To be able to realize that students can become economic agents in accordance with the demands of the free market or globalization, teachers as curriculum developers are required to develop learning materials and professional manner so as to produce graduates who are qualified according to the requirements.

**Keywords:** Challenges for Economic Education.

### 1. Introduction

Free trade as an international agreement involving various countries including Indonesia cannot be avoided anymore and should not be feared but was met with full preparation. Free trade is a challenge and an opportunity that should be utilized by all parties in the various aspects of life, including aspects of education. In this case study should be able to make rapid changes according to the demands of the free market that is able to produce human-human-quality, highly competitive, innovative and creative.

The challenge and the most fundamental issues facing the world of education is a matter of the quality of graduates is still low even decreased. Education For All (EFA) Global Monitoring published in Refort (GMR) in 2008, states that the Education Development Index (IPP)

or Education Development Index (EDI) Indonesia has decreased. EDI system split assessment scores three categories, namely the group of countries with high education index (0.950 and above), medium (0,800 to less than 0.950) and low (below 0,800). Based on the grouping of Indonesia, Malaysia, Philippines, Vietnam, Myanmar and Cambodia are included in the group and Brunei was ranked highest (Reuters, December 31, 2008). Based on the GMR report also appears that Indonesia's ranking dropped from 58 to 62 the total value obtained EDI Indonesia decreased from 0.936 into 0.935. Furthermore, based on the ranking of the Human Development Index (HDI) in 2008 Indonesia was ranked 109 out of 179; Brunei Darussalam, 27; China, 94; Malaysia, 63; Philipina, 102; Singapore, 28 and Thailand, 81 (UNDP, 2008) shows that the quality of human

resources in Indonesia is still far behind compared to other countries.

In addition to the above problems in the quality of graduates, Indonesia also faced with the challenge of launching the Millennium Development Goals which was originally launched in 2020 accelerated into 2015 Millennium Development Goals is the era of the free market or that an era of globalization characterized by quality competition. Indonesia joined the ASEAN Free Trade Area (AFTA), signed on January 28, 1992. In its development, this partnership was expanded to include a variety of other countries, including China so an advanced ASEAN-China Free Trade Area (ACFTA) and ASEAN Economic Community (AEC) which introduced in October 2003, will begin to be implemented in 2015.

Economic education as a field of study or learning at the institutional level education unit. Economic education focusing on how to prepare the subject student as an individual economic actors who have the knowledge and attitudes appropriate to the economic development of its era. The purpose of this would be reflected in the curriculum developed and operationalized based competency standards and graduate economics education subject areas. The nature of economic actors can as an individual consumer, the manufacturer, distributor or retailer.

## 2. Discussion

### 2.1. Economic Development in the Perspective of Free Trade

Free trade is increasingly felt and the impact on various aspects of life both economically, culturally, and politically. Forming free trade patterns of community life that is full of intense competition in every field of work, thus requiring the quality of human resources (HR) better. Competition is a principle of new life, the

world is open and free competition, to implement something better and better constantly. The motto certainly better tomorrow is the motto of a competitive society, which demands that humans are constantly changing, resilient, entrepreneurial spirit and have since not satisfied with what was achieved (Tilaar, 2006).

Furthermore Tilaar (2006) argues that in a life full of competitions like this causes people's demands for the quality of goods and services is also higher. Only the quality of goods and services are valued and needed by the community. The high demands on the quality of goods and services also ultimately affect the quality demands of education (schools). According to William Schweke (in Subroto, 2008) that education is not just going to give birth to qualified human resources, but also can give birth to a healthy business climate conducive to economic growth.

Some problems of economic education in the face of challenges of free trade, which is the first problem and the purpose of learning materials, the second model problem of learning strategies and methods, and the third problem educator / teacher. The third issue is the determinants of the success of economic and educational development, and things are interrelated and influence each other. The educator/teacher as a spearhead economic success of education in educational institutions demanded more professional in carrying out the learning process so that learning can create graduates who can deliver rapid change according to developments.

To realize the students become economic actors that fit the demands of free trade, the teachers are required to develop learning materials and process according to the needs of the context of free trade demands. Innovative learning strategies should be able to make the students learn

more happy and supported with the latest literature and materials. Practical learning media easily created and supported by technology and the ability to use appropriate language.

The present era is the era of free trade, the market economic system or the global economic system. Market economic system gives freedom of any economic actors throughout communities across the State to do economic resources most efficiently so that foster an atmosphere of competition in the global market. Because the characteristics of freedom to compete for all the actors are very strong global economy, the era is also known as the era of liberal economy, and because there is a process towards the liberal economic atmosphere, also known as economic liberalization (Wahjoedi: 2008). Listening to the present circumstances, when interpreted in terms of development economics, it is actually present era is the era of classical economics system development (Adam Smith) is characterized by the presence of individual economic freedom, the full workings of the market mechanism, the demand for efficiency, between individual freedom to compete globally, the role of the state as the dominant feature of the command economy into a decline, and no removal of entry barriers to the trade transactions between countries are more free society.

Although economic freedom are very strong coloring early 21st century, but that does not mean economic freedom is the only purpose of the social market economy system. According Wahjoedi (2008), there are 6 aspects of the social purpose of a market economy that should get attention by all individual economic actors, business people, and the government of a country. 6th aspect of the social objectives are: economic efficiency, economic justice, economic freedom, economic growth, economic security, and economic stability.

(1) economic efficiency in a market economy, all economic allocation decisions made by consumers and producers in the market. Specialization and international trade will increase productivity and competition. (2) Economic Justice, meaning there is a fair chance, people are free to make their own decisions how to use its resources and capacity, although not guaranteed to be successful. Revenue will depend on the value of labor and other resources that can be sold individually. (3) Economic freedom, understood as the private ownership of all kinds of economic resources and allowed individual freedom and control over valued resources. (4) Economic growth, interpreted as an incentive for individuals and businesses to produce more and to avoid contamination of concern in the efficient use of resources. Specialization, and capital investment in the education and training of workers, trade high concern of the output. (5) the economic security, meaning that in general, individuals are responsible for their own health, decreased ability, housing and income. But here some government programs undertaken to reduce risk and provide improved economic security as an aid for low-income families, unemployment compensation, social security, and job training programs of government. (6) economic stability, some unemployment can be tolerated, depending on the income sources are individually owned can be sold, the local government uses financial and tax policies to reduce the unemployment and inflation and pay attention to economic growth.

The development of the global economic system, has in determining the development of the important branches of the economy, and accounts for the basic study of economic education for the sake of learning. Therefore if you want to develop economic education to prepare the next

generation of free trade era, then there are at least four basic science education should be presented in the material economy, namely: fundamental (basic philosophy) economics, microeconomic theory, macroeconomic theory, and international trade. Meanwhile, for the sake of the regional autonomy era, then in addition to 4 economics mentioned above, also need to be added public economic studies.

Through public economics, it can be learned that the economic role of government in a free market economy and decentralization there are 4 main roles, namely: the role of allocative, distributive role, the role of regulation, and the role of stabilization. Allocative role, the government should allocate resources in order to create maximum efficiency. The role of distribution means balancing between efficiency and fairness in allocating resources through tax policy, social security and distribution services for the public sector affect the distribution of income. The role of regulation, the government makes the rules and laws of contract, consumer protection, law enforcement and others, thus supporting the market economy running. The role of stabilization, where the allocation, distribution, and regulatory rules coloring the *micro economic characteristics*; role in stabilizing the macro-economy through fiscal policy, monetary policy and other economic policies to achieve the objectives in controlling inflation, unemployment and others.

## **2.2. Role of Education Institutions Economic**

In the face of free trade economic institutions, especially institutions of formal education required to be able to prepare human resources who have the appropriate competence standards. For Indonesian standard is intended that graduates have the

minimum competency in accordance with the standards of the National Qualifications Framework Indonesia (KKNI) at each level of education. Thus economics education institutions as places where learning can take place economic education is expected to produce standards compliant of KKNI. When examined carefully, the economics of education the learning process can be mapped in a particular structure. These places include, formal schooling, family informal, non-formal and community.

Things that made the difference and necessary concern is that every institution where the learning process is economic education in learning formats. Learning formats that need to be introduced in each of the economic institutions of society and government, so that it can enter into the policy of both local and central government. Here the role of the educator can provide input for the determination of local government policies, especially for the benefit of the increase in economic skills.

### **2.2.1. Economic Education Learning Materials**

Economic education learning materials is very wide and dynamic to follow the development of the era. Can be likened to that, extensive studies of economic education materials is an area of human life activity ("as wide as human activity"), and all human life ("as long as human life").

Basically there are two sources of economic education learning materials, which is the source of theoretical and practical sources. Sources theoretically derived from the study of the development of philosophical thought which spawned economic theories, and practical source derived from a review of the analysis or empirical evidence, namely through research results, scientific journals. To obtain a practical source of phenomena that

occur in everyday field can be obtained through scientific magazines, newspaper articles, TV media, and the Internet.

If the sources are structured systematic theoretical economics, there are several main components, namely the analysis of philosophical, theoretical, applied side, and the trend of development economics. Each component has spawned the development of economics and applied economics. In the latest development, a branch of economics that plays an important role in the era of competition, namely fundamental economics, micro economics, macro economics, and international trade, and accounting.

### **2.2.2. Models, Strategies and Learning Methods**

The model is a conceptual framework that is used as a guideline in conducting the activities. So it is a learning model that describes the conceptual pattern and perform procedures in organizing systematic learning experience and learning to achieve specific learning objectives and serves as a guide for planning instruction for teachers in implementing learning activities. Learning strategies is related to the general pattern of teaching and learning activities (Transaction teaching) that should occur in the classroom during a lesson. *While the teaching methods means path or way which must be passed in order to achieve certain goals. Methodology is the study of ways to make the systemic activity of an environment consisting of educators and learners to interact with each other in doing an activity so that the learning process goes well in terms of learning objectives reached.*

So the model, strategies and methods of teaching economics education designed to achieve the learning objectives of economic education. More attention to the learning process, factors other than input

and output to be generated. The nature of learning strategies should be dynamic, innovative, with a focus on active student participation.

### **2.2.3. The Role of Teacher Education Economics**

Strategic component in the education system is especially teacher educators. Any attempt to improve the educational outcomes cannot be separated from the role of the teacher; because the teacher is the key and the central point of any education reform focused on qualitative changes. Because the teacher as one of the dominant component in the educational process, the role of the teacher needs attention.

According to Fajar (2005) teachers have a central position in an effort to improve the human resource. Although various approaches oriented education many students but the role of the teacher in the learning process is still very dominant. In any kind and the existence of teacher education is still the basic elements and very influential in education to the creation of quality human resources. In other words, the responsibility of improving the quality of human resource professionals in the hands of the teacher, because the roles and functions that directly implement the activity of.

In relation to the era of globalization and free trade economics teacher should at least have the characteristic; (1) master the disciplines correctly and follow the development of science and technology (2) learning method with good control, including innovations in learning (3) mastering the language of science, including international languages (4) mastering information technology (5) have a commitment and responsibility in carry out their duties (6) the profession properly rewarded (7) master research methodology (8) has a good moral qualities, and (9) has a modernist character (Wahjoedi: 2008)

Research Sidi (2000) found that in developing countries contribute to the teacher's performance is the quality of its graduates by 36%, 23% management, 22% learning time, and means 19%. Cruickshank (1990) found that the performance of teachers have an immediate effect on the learning process, meaning that if the performance of the teacher in the learning process better, the quality of graduates it produces good results. Sudjana (2002) found that 76.6% of student learning outcomes are influenced by the performance of the teacher with the details of the teacher's ability to teach to contribute 32.43%, mastery of subject matter contributed 32.38%, and the attitudes of teachers towards subjects contributed 8.60%. Dunkin (2001) found that the effectiveness of the teaching performance of teachers in dealing with the quality of graduates. The better performance of the teacher in the learning process of the higher quality of graduates in terms of academic achievement, the better.

Teachers as agents of learning required to have competence. Government regulation number: 19 2005 requires four competencies required of a teacher, namely: (1) pedagogical (2) personal competence (3) professional competence (4) social competence.

Teachers who master the four competencies, it can be referred to as a professional teacher. In connection with the professionalism of teachers, Act No. 14 of 2005 on teachers and lecturers expressed the principles of professionalism as follows:

- a. Have the talent, interest, spirit and idealism calls.
- b. Is committed to improving the quality of education, faith, devotion, and a noble character
- c. Have academic qualifications and educational background according to tasks.

- d. Have the necessary competence in accordance with the tasks.
- e. Has the responsibility for the execution of tasks professionalism.
- f. Earned income determined in accordance with work performance.
- g. Having the opportunity to develop in a sustainable manner with the professionalism of lifelong learning.
- h. Having a guarantee of legal protection and professionalism duty
- i. Having a professional organization that has the authority to regulate matters relating to the duty teacher professionalism.

### 3. Conclusion

Free trade requires us to enter into the competition and the quality or bring opportunities and challenges. Economic Education was faced with the challenge of how to design and implement learning that can produce graduates who have the knowledge and attitude competencies quickly adapt to changes so as to compete globally.

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