Profile of science education problems in west sumatera and its surroundings

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Abstract. The profile of the science education problem in West Sumatera and surroundings is reported in this paper. The purpose of this work is to investigate the various problems in science education in West Sumatera and its surroundings. Descriptive research method is used in the research. An addition, closed and open questionnaire instrument is applied in data collecting. The certified and non-certified teachers are selected as respondents using accidental and snowball sampling technique. The descriptive statistic and qualitative technique are performed in data analysis. Based on the investigated data, the main problems in science education in West Sumatera are (1) teacher (quality, uneven distribution and teaching load), (2) curriculum (amendment and implementation), (3) students (interest and learning creativity), (4) managerial (headmaster and leadership), (5) parents (parent or family care), (6) government (government polices), (7) community environment (lack of support), (8) infrastructure and facilities (uneven of building, laboratories, libraries, and other facilities), (9) problems of UN application as determinant of graduation, and (10) problem of teacher’s teaching burden post-certification. These findings show the science education problems in West Sumatera need to be follow up for improvement the education quality, especially in science education.

1. Introduction

Many problems faced in the implementation of education. The problem is the cause of hampering the achievement of educational goals. Problems in education can be viewed from various aspects, because education should cover many aspects. From the results of on-the-spot monitoring on the ground are aspects of teachers, curriculum, learners, management, parents, government, environment and society, facilities and infrastructure, National Exam implementation, and teacher teaching hours.

The teacher's problem is related to the excess hours of compulsory teaching of professional teachers, which is 24 hours. Based on the author's discussion with the principal of SMA Negeri 2 Padang, Drs. Habibul Fuadi, M.M. February 12, 2013 revealed that many problems arise as an excess of teacher certification (consequence as a professional teacher), especially related to the burden of teaching 24-hour teachers, including: 1. teachers who do not teach as much as 24 hours, 2. teachers honorarium is not threatened there is work again, since it has been taken over by professional teachers, and 3. many certified teachers are frustrated because of the difficulty of meeting the mandatory teaching hours.\[1][2]

More information was obtained in the field from Yenny Martha, Chemistry Teacher of SMA Negeri 1 Sawahlunto on February 12, 2013 and repeated again in 2016 at FMIPA UNP. The results of the interview revealed some facts and problems as follows: 1. Most teachers should look for additional
teaching hours to other schools for 24 hours, even have to teach in some schools, 2. The relationship between teachers who teach on the same subjects become harmonious because of the competition for teaching hours, 3. Teachers who teach 24 hours no longer have time and energy to make good learning preparations 4. Non-government schools benefit greatly from teachers of government schools teaching in their schools without paid (free), 5. Contract teachers are threatened with not working or their teaching hours will be lost, 6. The prospective teachers (graduates) from the Education Institute for Education Personnel are anxious, they will lose or lack of employment [3][4].

Another problem of teachers is the quality of professional teachers. While it cannot be denied that teacher professionalism is an issue that continues to grow and become a challenge of future education [5]. The facts on the ground about professional teachers (teachers passing certification) are not in line with the expectations of professional teacher standards. Professional teachers are teachers who master the science of teaching or experts in the field, mastering the science of learning strategies and insights of education and teacher, have the skills to teach, always develop self-potential (lifelong learning) and become role models for learners. To become a professional teacher is largely determined by the quality of the teacher itself. Work as a teacher is a profession that requires special abilities and knowledge in a particular field of study [6]. Meanwhile, the quality of a teacher is determined by many factors, including the faith and devotion of teachers, teacher knowledge, teacher's personality, teacher skills, teacher social relations, teacher motivation, self-development skills, caring, responsibility and so on. In other words, there is a very close relationship between professionalism and teacher quality [7][8][9][10]. Then, according to Law No. 14 in 2005 on teachers and lecturers formulated about the competence of professional teachers. In article 10, paragraph 1 stated, "teacher competence includes: 1. Pedagogic competence, 2. Personality competence, 3. Social competence, and 4. Professional competence [11]. The competencies that must exist in professional teachers according to Mareike [12] are knowledge of the content of the material and the way of teaching, confidence, work motivation, and self-regulation. Yusuf [13] explains that a professional teacher is one who is able to discipline, organize, motivate, administer, advise, provide solutions and guide.

Teachers as educators are the presenter and supplier of knowledge, role models and skills trainers. As a reseller of science, teachers must have a wide and profound knowledge far beyond the needs of his students. Teachers must have a love of science, be objective towards science and like to conduct careful investigation. For example, teachers should be able to set an example of how a behavior is properly categorized, in activities and actions. As a trainer, teachers should be able to make learners skilled in the various processes needed in their life [14][15][16].

Problems in science education generally include: 1. Inadequate competent science teachers, not yet able to demonstrate the process of science in classroom learning (especially in primary). 2. Pre-service training of teachers and in-service training is top-down model so that it does not meet the needs of teachers with diverse capabilities and backgrounds. Pre-service training of teachers is a teacher's education given to everyone in order to prepare them to teach at every level of education while graduating, and in-service training is an education to be a teacher to people who basically have no teacher qualifications [17]. 3. Assessment of the teacher is still on the assessment of knowledge learning outcomes, while the affective and psychomotor aspects are ignored. 4. Low performance of teachers, due to inadequate laboratory factors, limited ability of teachers and equipment limitations. 5. The curriculum focuses on theoretical science. 6. Very large curriculum content [18]. The problems mentioned above are still partial and not comprehensive, no mapping can be presented as the main problem profile of science education in western Sumatera and its surrounding areas. With this research can be disclosed various major problems in science education. The purpose of this study is to disclose various forms of problems in science education in West Sumatera and surrounding areas.

2. Method
This type of research is descriptive research. The research findings described are the profile of science education problems in West Sumatera and surrounding areas. The study population includes teachers who have educator certificate, teacher without educator certificate, honorarium teacher and
prospective teacher. The sample is part of a population member that is considered representative. There are two sampling techniques used, namely incidental and purposive sampling techniques [19][20][21][22]. The incidental technique is carried out for sampling of professional teachers, non-professional teachers, honor teachers, and science teachers who attend the Lecture Leadership Elementary Education, as well as post-graduate students of Biological Education UNP in early 2014 and 2015. The purposive technique is undertaken to take any suitable sample characteristic. With this technique then the number of samples collected is 143 people, with details:

2.1. Science teacher in Junior High School (40)
2.2. Science teacher in Senior High School (40)
2.3. Teacher in Vocational High School (10)
2.4. Non-certification teacher and honorary teacher (20)
2.5. Postgraduate students in Biology Education (33)

The instrument used is a closed questionnaire (in the form of Likert scale) and an open questionnaire in the form of contents or descriptions. Before the questionnaire was used it was validated by education experts. Data analysis techniques used are quantitative techniques (in the form of descriptive statistics), and qualitative techniques (in the form of description / narration in the form of words and sentences).

3. Result

3.1. Result
After analyzing the research data, the results obtained as shown in Table 1.

Table 1. Profiles of Major Educational Science Issues at Schools in West Sumatera and Surrounding (143 respondents)

| No | Problems that was found                                      | Frequency | Percentage |
|----|-------------------------------------------------------------|-----------|------------|
| 1  | Problems from the teacher aspects                           | 88.73     | 62.05      |
| 2  | Problems from the curriculum aspects                        | 116.36    | 81.37      |
| 3  | Problems from the student aspects                           | 121.96    | 85.29      |
| 4  | Problems from the managerial aspects                        | 119.15    | 83.32      |
| 5  | Problem from the parent/family aspects                      | 122.81    | 85.88      |
| 6  | Problem from the Government aspects                         | 102.31    | 71.55      |
| 7  | Problem from the environment/community aspect                | 112.71    | 78.82      |
| 8  | Problem from the infrastructure, facilities and learning facilities aspects | 128.97 | 90.19      |
| 9  | Problem from the application of UN as a determinant of graduation aspects | 120.25 | 84.09      |
| 10 | Problem from the burden of teaching the teacher post aspects | 127.33 | 89.04      |

When considered carefully Table 1 shows ten dominant problems occurring in the field. The most dominant problem according to the assessment of the teachers or non-teachers is the problem of facilities and infrastructure, followed by the problem of teachers' burden of post-certification teachers, parents, learners, national exam as determinants of graduation, management, curriculum, environment,
government and teachers. Basically, all the problems that have been revealed are the main issues that should be the attention of the authorities.

3.2. Discussion

Problems in terms of aspects of teachers include: 1. Teacher learning strategies are less precise, less varied. 2. Teacher teaching style does not please learners. 3. Teacher affection cannot be followed. 4. The implementation of teacher's duties (as teachers, educators and trainers) is not yet optimal. 5. Teachers' ability to determine and present essential material is relatively poor. 6. Performance of teachers in implementing learning is still relatively less. 7. Duties that are too dense for students. 8. Only rely on student worksheets sold by certain publishers (student worksheets should be made by the teachers themselves). 9. Lack of applying discipline to students, and 10. Science presented theoretically, not yet use the laboratory optimally. The issues expressed are closely related to the issue of teacher professionalism that needs to be improved. In line with the professional problem of this teacher, Rivai and Murni [23] stated that the current teacher problem is the input that goes to the Education Institute of Education Personnel is low. The action that must be implemented in order for qualified teachers is to improve the quality of their learning process, increase teacher salary, evaluate the teacher profession periodically, develop teacher career, tighten the selection of prospective teachers, and only qualified Teacher Education Personnel authorized to produce teachers. One solution that can be given is to use cooperative learning model, because cooperative learning model can improve student academic achievement and support the formation of interactive learning experience [24]. Teacher career development is carried out with trainings. At present, what is important to note for teachers is the increased use of technology to support the learning process such as mobile devices. It has been proven that the role of mobile devices can be an option in creating the flexibility of the learning process [25].

Teachers who have passed the certification are called professional teachers. Professionals are experts in their field who have received special education or training for their work. In the field of education, professionals are formed through basic education, secondary education and higher education. The meaning of the profession of teachers and professional teachers needs to be well understood. To understand profession profoundly it is important first to understand the concept of the profession [26][27][28][29], especially familiar with the characteristics of the profession. The characteristics of a profession include: 1. Having a special skill. 2. It is a vocation of life. 3. Have standard theories. 4. Devote yourself to society and not just to yourself. 5. Comes with applicative diagnostic and competency skills. 6. Have autonomy in carrying out its work. 7. Have a code of ethics. 8. Having a clear client. 9. Have a strong professional organization. 10. Have a relationship with the profession in other fields [30][31].

Problems in terms of curriculum aspects include: 1. Comprehensive and extensive curriculum content that requires teachers to pursue curriculum targets. 2. Implementation tends to be cognitive-oriented and low-level cognitive tendencies. 3. Teachers can not apply various learning models because of the many material. 4. Evaluation tends to be dominated by the cognitive domain. 5. No synchronous planning, implementation and evaluation of learning. 6. The curriculum is poorly understood and improperly implemented by teachers. The change of curriculum is not based on an in-depth evaluation of the previous curriculum. Tend to happen every change of government also followed curriculum change. Tend also the new curriculum can not be understood teacher well so can not also run well. The main problem of this curriculum is that the material is too dense to be content-oriented and cognitively prioritized. Yulaelawati [32] states that the content of science curriculum in Indonesia is more extensive than other countries. Regarding the issue of this curriculum, Hasibuan [33] states that the competency-based curriculum is an effort to develop a competency-oriented curriculum rather than content. It is realized that content-oriented curriculum tends to be dense and prefers cognitive aspects, thus encouraging teachers to process "how to know and what should be to know". Therefore, teachers focus more on mastery of theory than attitude and skill. Meanwhile, the competency-based curriculum leads to the development of learners' abilities in "what to do and how to
do" so that teachers do not think too much about material, but must materialize, emphasize essential material and put more emphasis on the development of learners' abilities holistically.

Problems reviewed from the aspect of learners include: 1. Reading interest is relatively low. 2. Learning motivation is relatively low. 3. The reasoning power is relatively low. 4. Independence less learning. 5. Do not have a learning strategy that is telling. 6. Not very good at using time effectively. 7. Not yet good at utilizing the optimal learning resources. 8. Asking activity is relatively low. 9. Do not believe in studying in school if they do not follow lessons elsewhere. The problem posed is a problem that comes from the students themselves, namely the ability to manage time and learning facilities. This is known as self-regulated learning (SRL). SRL can affect student motivation and student motivation can influence learning achievement [34]. Students' reading interest can be enhanced by fostering individual interest, fostering situational interest, choosing reading reading readings and using interesting learning strategies [35]. The students' problems expressed above will be very disadvantageous for the younger generation even for the future of the nation, a solution must be sought. All the problems mentioned above must be attempted by the teacher, the parent to train them to solve the problem of self-study, and the government must facilitate it. All of the above mentioned problems are closely related to students' ability to science. Reading interest and students' ability to read are influenced by many factors, one of which is a supportive home atmosphere [36]. Lufri and Latisma [37] state that learning of mathematics and natural science is a big problem not only in the village but also in the big cities. Many educational institutions say that learners have difficulty learning Mathematics and natural science because it is not all they love Mathematics and natural science. Supposedly, students who are not talented mathematics and natural sciences are directed at the social sciences.

Problems in terms of managerial aspects include: 1. Lack of leadership attention to the facilities and infrastructure of science. 2. Difficult to request procurement of equipment and materials for the laboratory. 3. Teacher training is not evenly distributed. 4. School policies are influenced by bureaucratic interests that often do not meet the needs. 5. There is no application of reward and punishment for teachers. 6. There is no responsibility of teachers who have attended training to share or apply the knowledge they get. This managerial problem is closely related to leadership and leadership commitment. Unesco Science Report [38] reveals that there are eleven important issues in science education policy, out of these eleven issues teachers are the most highlighted aspect. Teachers are a key factor in science learning, but it does not mean teachers are the only decisive factor but managerial aspect is also very important because teacher performance is closely related to leadership performance.

Problems reviewed from the aspect of government include: 1. Less optimal government attention in the procurement of facilities and infrastructure. 2. Less than optimal government attention in the procurement of libraries. 3. There is a lot of government intervention on education policy. 4. Inadequate government policy on professional teachers. Governments should use priority-scale policies, education programs are organized according to their urgency or based on needs so that the education budget can be used effectively and efficiently. For examples the very urgent thing in science education is the laboratory. Apparently most public schools in Indonesia still do not have a laboratory building. Based on Ministry of National Education data [39] it is known that 68.45% of SMA Negeri in Indonesia do not have a laboratory.

Problems in terms of parent / family include: 1. Parent busyness and parent education is less supportive. 2. Less provides learning facilities, such as study rooms and books. 3. Less able to guide children doing homework at home. 4. Lack of parents monitor the activities of everyday children because busy. 5. Lack of parental discipline to the child. 6. The magnitude of television influence. The parenting of the child in the case of television viewing can significantly affect the attitudes formed in the child, such as an aggressive attitude [40]. The bad effects of watching television without parental supervision include crime, aggressive habits, obesity, low immunity, and decreased performance at school [41]. The role of parents also greatly determines the success of students. Lufri and Latisma [42] state that in the new paradigm everyone (parents, principals, teachers and the community) jointly asks
questions about "what can all of us together do to educate all children well." This question indicates that parents should be actively involved in the education of the child. Parents' participation in monitoring children's educational attainment levels can improve learning effectiveness. One such form of participation is to create a literacy-based home atmosphere. This role is strongly supported by the level of parent education. Parental education level will affect the level of student education and type of work in the future.

Problems seen from aspects of the environment / community include: 1. Environment is less supportive of creating a conducive learning atmosphere. 2. The influence of television viewing on learners. 3. Influence negative impact of technological progress (mobile and internet). 4. Poor community to create a learning atmosphere. 5. Students' religious education for junior and senior high schools is inadequate while it is urgently needed to determine the type of career they will be living. The role of society cannot be ignored in education, as does the role of parents. In other words, community support is needed for the educational progress of learners and their success. Then, it can also be said that a good community environment will affect both the educators, and vice versa. Mansi states that the environment around the learner can support or inhibit the attitude of students' scientific creativity.

Problems reviewed from aspects of facilities and infrastructure include: 1. School buildings that have not been standard. 2. Laboratory building that is not yet adequate and not yet standard. 3. Inadequate laboratory equipment. 4. Learning media that have not been developed and used optimally. 5. Other supporting facilities (libraries, school gardens, etc.) are not adequate. The quality of education is determined by the completeness of education facilities and infrastructure. Especially for science research, the main problem in infrastructure is the inadequacy of the laboratory. Student satisfaction with existing facilities may affect their exam results, although not significantly, especially in primary level education.

Problems in terms of aspects of the National Examination as a determinant of graduation include: 1. Schools in Indonesia are not ready to accept the National Exam as a determinant of graduation. 2. The result cannot be guaranteed purely. 3. Encourage the lies of various parties. 4. The impact of decreased learning motivation of students. 5. Impact on the students' respect for the teachers. 6. The impact of useless learning methods for students. 7. Impact stress for teachers in carrying out the task. 8. Affects the decrease in teacher motivation in learning. Given the large negative impact when the National Examination is used as a determinant of graduation, then the teachers suggest the National Exam should not be used as a determinant of graduation of learners.

Problems in terms of the burden of teaching professional teacher post-certification include: 1. Teachers do not have time to make preparing for the best learning. 2. Cause fatigue which resulted the teacher is not optimal to implement learning. 3. The honor teacher loses his job. 4. Some certified teachers are frustrated because it is difficult to meet the burden of teaching. 5. The teacher's focus on learning in the original school becomes disrupted. 6. The emergence of cases of professional teachers must pay the salary of the honorarium teacher he replaces. 7. Good relationship between teachers becomes disturbed. 8. Junior teachers are forced to find another school to cover the burden of teaching. 9. Professional teachers experience lack of time and energy to learn and make preparations. 10. The occurrence of cases, teachers are forced to contribute to certain private schools to meet the burden of teaching. 11. There is anxiety of prospective teachers (graduates) from the Education Institute of Education Personnel because they will lack of employment. From the problems of professional teachers above shows that professional teachers have not received serious attention by the
government is marked by government policy has not been in favor of the fate of professional teachers. Therefore, the problems of professional teachers and post-certification excesses should be sought and should be addressed. The teacher should still receive a professional allowance in accordance with the available expenses even if not meet 24 hours.

4. Conclusion
Based on research data, it can be concluded that there are ten major problems in science education in West Sumatera and surrounding areas. These problems are the aspects of teachers (quality, uneven distribution and teaching burden), curriculum aspects (change and implementation), learner aspect (interest in learning and creativity), managerial aspects (headmaster and leadership), parent aspect (parent or family), governmental aspect (government policy), environmental aspects of society (lack of support), aspects of facilities and infrastructure (buildings, laboratories, libraries and other facilities), aspects of the implementation of the National Examination as a determinant of graduation, and aspects of teacher's teaching burden post certification.

Advice
Based on the findings in this study, the researcher suggests that education problems in West Sumatera and surrounding areas need to be followed up by the authorities in order to find a solution of the problems in order to improve the quality of education, especially in science education in the future.

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