The Final Thesis Project is the Main Determinant of the Length of Study Period for Undergraduate Students of the Faculty of Mathematics and Natural Sciences, Universitas Negeri Medan

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Abstract. The purpose of this study was to find out the factors affecting the students' length of study period especially those related to the academic governance, thesis guidance, and supporting facilities at the Faculty of Mathematics and Natural Sciences (FMNS) of the State University of Medan (Unimed) in the academic year of 2017/2018. Questionnaires were distributed to 469 final year students and 170 thesis supervisors (TS), which represented eight study programs and one Bilingual Program, as well as to 32 administration staff (AS) in FMNS of Unimed. Questionnaires consist of 44 (students) or 40 (TS) or 15 (AS) closed and open questions related to administrative and TS services, supporting facilities, and subjects. Data were analyzed descriptively. The results show that the average length of the study period is 8.9 semesters, far longer than the ideal one (8 semesters). The most important factor contributing to the prolongation of the study period is the length of time needed by the students to complete the thesis final project (TFP), which is an average of 1.6 semesters. Factors causing the prolongation of the TFP completion period include: (a) the administrative staff service function is less supportive, (b) supporting facilities (such as SOPs, Thesis Guidebooks, internet, references in libraries, and laboratory facilities) cannot be utilized properly by students, (c) supporting subjects, especially English and Statistics, have not contributed well to the completion of TFP, and (d) the commencement of TFP work, namely in semester VIII, is too late. To overcome the problems, the following actions need to be taken: (a) improving the quality of administrative services and simplifying TFP governance, (b) updating SOPs and thesis guidebooks, library references, internet, and laboratory, (c) increasing the relevance of the contents of supporting thesis courses, and (d) repositioning of TFP courses one semester earlier. Train students early to find and use references to conduct mini-research and student creativity programs, and their involvement in the lecturer’s research will also be very helpful.
1. Introduction
The Faculty of Mathematics and Natural Sciences, Universitas Negeri Medan (Unimed) has taken various efforts to facilitate students to graduate on time. Improvement of the new student recruitment system, improvement of lecturers' academic qualifications, curriculum reorientation, introduction of new learning models [1–3], improvement of teaching materials [2,4] and media [2,4,5], standardization of subject assignment models [4] and assessment processes and instruments, and simplification of academic administration are some examples of actions taken.

The 2016 data shows that the average length of the study period for FMNS students is 4.54 years, with an average cumulative grade point average (GPA) of 3.18 and an average length of time of final thesis project (TFP) completion of 6.2 months [6]. Among the above three indicators of graduate quality, the length of study period, and the duration of the FTP completion are the two lowest indicators and need to be given very serious attention. Even though the average GPA of graduates is good enough (where the minimum GPA requirement pegged to be able to register and get a job in public and private institutions is 2.75-3.00), but the average length of study period required by graduates to complete undergraduate programs are still quite far from the ideal condition, i.e., four years. The increase in time needed by graduates to complete the program for 0.54 years seems to be closely related to the length of time needed to complete the TFP. The average graduate needs more than half a year to complete their TFP. If the length of time to complete the TFP can be reduced to only four months, then the study period will be shortened for two months, to 4.34 years.

The FMNS of Unimed has set the targets to be achieved in the next five years as follows: (a) 75% of graduates have GPA ≥ 3.00, (b) 50% of students graduate on time, ie, eight semesters, and (c) 65% graduates have a work waiting period of fewer than six months. Achieve these targets, it is necessary to resolve current barriers through various policies and actions. Therefore it is necessary to identify the factors that affect the achievement of these targets to be used as material for making corrective policies and actions. This research is intended to find out the factors affecting the length of study period and completion of students TFP in FMNS of Unimed in the academic year of 2017/2018.

2. Materials and Methods

2.1. Location, Time and Subject
The study was conducted from June to December 2017 in 8 study programs and bilingual programs at the Faculty of Mathematics and Natural Sciences (FMNS), State University of Medan (Unimed). The research subjects were the final year students who were taking thesis final project (TFP), both education and non-education study programs, thesis supervisors (TS), and administrative staffs (AS).

2.2. Population and Sample
The population in this study were all of the final year students who were working on TFP (1,172 students), and TS (227 lecturers), as well as all of AS (54 people) in FMNS Unimed in the academic year of 2017/2018.

Students are sampled proportionally from each Study Program by considering the representation of all TS to obtain 40% of all students per Study Program, resulting in 469 sample students. All lecturers who are currently serving as TS, namely 170 people (according to the Decree of the Dean of FMNS No. 0104/UN33.4/KP/2016 dated 22 August 2016 concerning the appointment of TS) and all educational staff who were directly related to administrative services (30 people) are also included in the sample.

2.3. Data collection technique
Data were collected by using a questionnaire technique. Closed and open written questions are submitted to portrait opinions, suggestions, and input from respondents. Respondents were asked not to fill in personal identities on the questionnaire, except for the identity of the department and study program.
2.4. Research Instrument

2.4.1. Student questionnaire. Student questionnaires consist of 44 questions grouped into five aspects, namely administrative services, supporting facilities, TS services, the contribution of TFP supporting subjects, and student experience. Administrative services included the clarity of procedure, schedule and time, the accuracy, easiness, and convenience of services, the accuracy and reliability, and friendliness of the education staff. Aspects of supporting facilities involve the clarity of guidelines, time and costs, completeness of guidelines, availability, speed, and reliability of internet facilities, reference availability in a library, and laboratory availability. The TS service aspect concerns hospitality, ease of communication, the clarity of schedule and adequate time to guide, expertise suitability of TS, guiding abilities, language use, clarity of instruction, attention, and motivating abilities. The role of supporting subjects in the completion of the TFP concerns the Seminar, Research Methodology, English, Statistics. Aspects of students’ experience are related to the length of time for completing studies, writing proposals, completing TFP, revising proposals, completing research, writing theses, and their opinions on the ideal semester to start a TFP.

2.4.2. Lecturer Questionnaire. The lecturer questionnaire consists of 40 questions, which are grouped into five aspects, namely aspects of administrative services, supporting facilities, TS services, the role of the course, and aspects of the experience. All questions submitted to the lecturer are almost the same as the questions to the students.

2.4.3. Administrative Staff Questionnaire. The questionnaire consists of 15 questions, which are grouped into two aspects, namely administrative services they provide to students and their expectations in order to improve the service quality. The administrative service aspects that are asked include the clarity of procedures, ease of dealing, convenience of the administrative environment, reliability of time, friendliness, and accuracy of staff services.

2.5. Research Procedure

2.5.1. Questionnaire Development and Validation. The questionnaire was developed by researchers based on the parameters for the TFP quality contained in the Administrative Services and Thesis Guidance Standards at FMNS of Unimed. The questionnaire was then tested to the previous final year students who were still remaining and writing their thesis. The results of the trial were then used to revise the questionnaire before it was distributed to the respondents.

2.5.2. Questionnaire Distribution and Collection. Questionnaires were distributed to students, TS, and administrative staff respondents directly by the team, the volunteer team of students, and the education staff. Respondents have explained the purpose of the study, the number and meaning of questions, and how to fill out questionnaires, as well as the deadline for returning it. Respondents were allowed to take a questionnaire and fill it at home and be given a maximum of 3 days to return the questionnaire. The collection of questionnaires that have been filled out by respondents is carried out in two ways, namely voluntarily or by being asked directly to the respondents. 75% of the questionnaires were collected because they were voluntarily returned by the respondent before the deadline, while the rest of 25% just collected on the third day after being asked directly to the respondent.

2.5.3. Sorting Questionnaire. The returned questionnaire was sorted based on the completeness of the sheets, and the questions answered by the respondents. Only the complete questionnaire and all questions were answered by the respondents included in the analysis. Based on these criteria, the percentage of questionnaires that were worthy of analysis was 93% (436 copies) for students, 77% (131 copies) for TS, and 63% (20 copies) for educational staff.
2.5.4. Questionnaire Analysis. The answer of the respondents was analyzed by making an analysis table consisting of columns (number of questions) and rows (number of respondents). Each column (question) was filled with scores according to respondents' answers with the following criteria: very satisfying (score 4), satisfying (score 3), unsatisfactory (score 2), and very unsatisfactory (score 1).

2.6. Data Analysis
Data were analyzed descriptively on score data, number (frequency), or percent. Data is presented in the form of brief descriptions, matrices, graphs, and charts.

3. Result
3.1. Length of Study Period
The average length of the study period of respondents was 214 weeks (8.9 semesters), where all study programs completed their students exceeding the ideal study period with variations between 11 - 34 weeks or 0.4 - 1.4 semesters (Figure 1). The study program with the students’ study period closest to the ideal one is Chemistry Study Program (203 weeks or 8.4 semesters), and the one that passes the most is Biology Education Study Program (226 weeks or 9.4 semesters). The average study period of non-education study program students (212.2 weeks) is slightly shorter than that of the education study program students (215.4 weeks).

Figure 1. The average length of the study period of students showed numbers at the base of the bar. All study programs graduate students with a study period exceeding the ideal or theoretical study period with an extension varying between 11 - 34 weeks (numbers with a plus sign above the bars). The dashed line shows the theoretical study period. The length of study period for FMNS (214 weeks = 8.9 semester) is the average study period of all study programs: MESP = Mathematics Education, PESP = Physics Education, CESP = Chemistry Education, BESP = Biology Education Study Program, BIL = Bilingual Education Program, MSP = Mathematics, PSP = Physics, CSP = Chemistry, and BSP = Biology Study Program, FMNS = Faculty, Theor = ideal or theoretical length of study period.

3.2. Length of Study versus TFP
The total learning load for undergraduate students is 150 credits, consisting of 144 classroom courses and six credits Thesis Final Project (TFP). The proportion of time needed by students to complete the two study learning load groups is showed in Figure 2. The average time needed for students to complete 144 credits classroom lectures is 174 weeks or 7.2 semesters (ideally seven semesters) while those for six credits of TFP are required 39 weeks or 1.6 semesters (ideally one semester) (Figure 2a).
Figure 2. The length (A, in weeks) and proportion (B, in%) of time required by students to complete 144 credits of lecture load and 6 credits of thesis final project (FTP). The average length of time needed by FMNS students to complete 144 coursework is 174 weeks or 7.2 semesters, while for TFP of 6 credits is 39 weeks or 1.6 semesters. The theoretical time proportion for 144 credits lecture courses and six credits for TAS is 7: 1 or 88%: 12% (see Figure 1 for the name of study programs).

The ideal proportion of time to complete 144 credits learning load and 6 credits TFP is 7 : 1 semester or 88% : 12%. Figure 2 shows that all study programs experience deviations from the ideal proportion of time, the time needed to complete the TFP is too long with an average of 18% (range 16-25%) compared to the ideal proportion of 12%. This shows that the prolongation of the study period is due to the length of time for completion of the TFP.

3.3. Stages of Thesis Final Project (TFP)
In this study, the TFP was divided into five major stages, namely the stage of proposal writing, revision, research or fieldwork, thesis writing, and revision. The period of time for the proposal writing stage is calculated starting from the appointment of the Thesis Supervisor (TS) until the proposal seminar; the proposal revision stage is calculated starting from the implementation of the seminar until the approval of conducting research by DPS; the stage of the implementation of the research starts from the approval of the implementation of the study until the issuance of the Certificate of Conducting Research (SKTMP); the stage of thesis writing starts from the issuance of the SKTMP until the DPS approval for the thesis examination, and the thesis revision stage is calculated from the thesis exam to the final version and the approval of the thesis multiplication agreement by TS.
Figure 3. Length (A, in weeks) and proportion (B, in %) of time needed by the students to complete each stages of the thesis final project (see Figure 1 for the name of study programs).

The length and proportion of time needed by FMNS students to complete the TFP stages showed in Figure 3. In Figure 3a, it is clear that there are variations in the length of completion of the TAS between study programs, where Mathematics Study Program students need the longest time (53 weeks or 2.2 semesters) while the Chemistry Study Program and Bilingual Program require the shortest time (each only 34 weeks or 1.4 semesters) to complete the TAS. The average time needed by FMIPA students to complete a TAS is 39 weeks (1.6 semesters). Figure 3b shows that the largest proportion of TAS completion time is spent by students when writing proposals (average 35%, range 27-41%); while the time for researching the field or laboratory is only 13% (range of 10-25%).

Variables that influence the completion of TFP include motivation to graduate on time, ability to write scientific papers, availability of learning resources, quality of guidance (by TS), and peer environment. Motivation of students to graduate on time [7–9], writing skills [7,9,10], availability of learning resources [7,9,11], the quality of guidance provided by the TS [9,12], and peer environment [9,12], both individually and jointly are the factors that influence the completion of the TFP.

3.4. Quality of Services Related to Completion of TFP
To find out what causes the extension of time and anomalies in the use of time at each stage of TFP completion (where the time for completing the proposal is longer than the implementation of the research), students are then asked about their opinion on service quality related to the completion of TFP. Services include administrative services, availability of supporting facilities, Thesis Supervisor (TS) services, and the role of supporting courses for TFP completion (i.e., Seminar, Research
Methods, English, and Statistics). The general description of service quality obtained by FMNS students while completing TFP showed in Figure 4. In the picture it can be seen that students are very satisfied with the quality of TS services and are satisfied with the quality of administrative services, the contribution of TFP supporting subjects and availability of supporting facilities at FMNS, even though the last service aspect is called student answers vary greatly between study programs. In the aspect of availability of supporting facilities (laboratory, internet, etc.), Biology and Chemistry study program students stated they were not satisfied.

Figure 4. The quality of administrative services, supporting facilities, and thesis supervisors in the completion of TFP according to students. Students are satisfied with administrative services and facilities (except Biology and Chemistry) and are very satisfied with the quality of the guidance services provided by the thesis supervisor (TS) (see Figure 1 for the name of study programs).

To see more details about the opinions of FMNS students on the quality of services obtained during completing the TFP, in Figure 5 the results of the analysis data are displayed on the number (%) of students who say they are dissatisfied (score 2 in the questionnaire) and very dissatisfied (score 1) for each questions relating to aspects of service related to the completion of the TFP. The picture clearly shows the facts as follows:

a. The service aspect that receives the least dissatisfied and very dissatisfied response is the TS service. This shows that students appreciate the quality of service (guidance) provided by TS.

b. The study program with students who gave the least answer to be dissatisfied and very dissatisfied was the Physics study program. This indicates that the quality of all types of services was greatly appreciated by students of this study program and acknowledged that this service greatly helped the completion of the TFP.

c. The most study program states that complaints are dissatisfied and very dissatisfied is the Biology study program. Many of the study program students complained about aspects of administrative services, facilities and supporting courses, but no one complained about TS services.

d. Service aspects that are most often given responses that are dissatisfied and very dissatisfied are aspects of supporting facilities (such as the availability of laboratories, libraries and others).
Figure 5. The percentage of students being dissatisfied and very dissatisfied with the quality of administrative, supporting facilities, lecturer services, and the role of supporting subjects. Biology Study Program has the highest number of students who are very dissatisfied or dissatisfied while the Physics study program students show the highest satisfaction among all study programs. The availability and quality of supporting facilities (laboratories, libraries, and the internet) are aspects of service the most complained of by students (see Figure 1 for the name of study programs).

3.5. Role of Supporting Subjects to Completion of TFP
To find out whether the course is intentionally designed and given to students as supporters of TFP (i.e., Seminar, Research Methods, English, and Statistics courses) play a role in the completion of TFP, students are asked to express their opinions. Figure 6 shows the opinions of students about the role and function of supporting subjects in the completion of the TFP. Even though the score for this is around 3 (or good), the student's answer is not very firm and very varied between study programs.

Figure 6. Function and contribution of supporting courses (Seminar, Research Methodology, English, and Statistics) for the completion of the final thesis project (TFP) according to the students. All students are not firm that the courses are contributed well to the completion of their TFP (see Figure 1 for the name of study programs).

In Figure 6, it can be seen that the students of Mathematics Education Study Program and Biology Study Program gave the lowest rating of the roles of the four subjects to the completion of their TFP. Almost all students argue that the role of the English language course is lowest (among the four supporting subjects) in the completion of the TFP, except for students in the Bilingual Program.
semesters in the hope that they will provide students with supporting knowledge that can help them in designing (writing proposals), carrying out research and reporting (writing a thesis, presentation report) or completing TFP.

The proportion of students who assess dissatisfaction and very dissatisfaction with the role and function of the four subjects after the TFP is shown in Figure 7. The number (%) of students who felt the most dissatisfaction with the fourth course came from Biology Study Program (50% were dissatisfied with English courses, 36% dissatisfied with Statistics, 21% dissatisfied at the Seminar course and 7% dissatisfied with the subject Research Method), while those who feel most satisfied are students from the Physics Study Program. For the course itself, the most complained of by students lacking the role or support for the completion of TFP is the English course, and the least complained subject is the Research Method subject. The names of the subjects, respectively, from the most to the least complained of by FMNS students, are English (22% of FMIPA students are very dissatisfied or dissatisfied with the roles and functions of courses in completion of TFP), Statistics (16%), Seminar (12%), and Research Method subjects (10%).

Figure 7. The proportion of students who expressed a dissatisfied and very dissatisfied opinion on the role and function of the four TAS is supporting subjects, namely Seminar, Research Methods, English, and Statistics. English and statistics are courses most complained by the students for their function and contribution to the TFP, and Biology and Chemistry Education Study Program students are the most dissatisfied (see Figure 1 for the name of study programs).

3.6. Service Quality of Thesis Supervisor

The service quality provided by the TS in the student's opinion is shown in Figure 8. FMNS students thought they were satisfied until they were very satisfied with the services provided by TS, both academic services (suitability of expertise, ability to direct, clarity of instruction and language used by TS), communication skills (schedule clarity, time adequacy, and ease of communication with TS), and non-academic services (friendliness, motivational willingness, and attention given by TS) (Figure 8). From the TS academic service, student opinions about the TS expertise suitability points showed greater variation than the other three points (i.e., directing ability, clarity of instruction, and language use). Mathematics Study Program students are very satisfied, while Chemistry Education Study Program students only express satisfaction with the suitability of their TS lecturers' expertise; the average (ie, FMNS) is in the very satisfied category (Figure 8a). From the aspect of communication, the points of time availability and ease of communication with TS (Figure 8a), while from the non-
academic aspects, the willingness and ability to motivate TS (Figure 8c) were also quite varied even though they were still in the satisfied and very satisfied category.

Figure 8. The quality of services provided by TS during the thesis supervision period, including academic (A), communication (B), and non-academic services (C). All students are satisfied or very satisfied with all the services provided by TS. Scores for FMNS are the average score of all existing study programs (see Figure 1 for the name of study programs).

3.7. Clarity of Administrative Instruments
For clarity of devices or administrative instruments, both faculty employees and students are equally asked for their opinions. The opinions of FMNS staff and students about the clarity of SOP, schedule, flow, instructions, and information needed when dealing with the availability of administrative facilities and infrastructure are shown in Figure 9. For aspects of SOP clarity and dealing schedules, students really disagree with employees where students give ratings far above employee expectations, and employees feel dissatisfied while students feel satisfied. As for the clarity of the flow and the availability of information, the two parties (employees and students) have truly the same opinion. Both are satisfied. On average, the overall score given by employees for this aspect is lower than the score given by students.
Figure 9. Availability and/or clarity of service instruments (i.e., SOPs, schedule, administration flow, instructions, information, and infrastructure facilities) in FMNS according to administrative staff and students.

3.8. Quality of Administrative Services
Figure 10 displays data about the opinions of FMNS employees and students regarding the quality of administrative services provided by employees. Service quality concerns the ease, speed, accuracy, accuracy, friendliness, and reliability of the administration. In the picture, it can be seen that even though the employee gives an assessment that tends to be higher than the student on the quality of administrative services, but generally both parties argue that the quality of service provided by the employee (and received by students) is in a good category.

Figure 10. The quality of administration services related to the TFP completion according to staff and students. The administrative staff gives ratings that tend to be better than students in the character of ease, accuracy, and reliability of service; on the contrary, in the character of accuracy, thoroughness, and friendliness of students gives an assessment below the expectations of staffs. In general, administrative staff and students agreed that the quality of service provided by employees (and those obtained by students) was in a good category.

3.9. Supporting Facilities
Supporting facilities are asked of students regarding the TAS Guidebook (clarity and completeness of content), library (library availability and reference adequacy), laboratory (availability), and internet (availability, speed, and reliability). Student opinions about supporting facilities for the implementation of TAS are shown in Figures 11, 12, and 13.

3.10. TFP Manual Book
Students' opinions about the clarity and completeness of the contents of the TFP Implementation Manual are displayed in Figure 11. For this question, students in educational study programs give opinions that tend to be better than students of non-educational study programs. Biology Study Program students even gave a score of 2.5 (less clear and incomplete) to the two aspects of the Guidebook asked.

![Figure 11. Clarity and comprehensiveness of the TFP Manual Book according to students. Education Study Program students give an assessment that tends to be better than Non-Educational Study Program students in terms of clarity and completeness of the TFP Manual Book contents (see Figure 1 for the name of study programs).](image)

3.11. Library and Laboratory

In Figure 12, the opinions of students about the availability of libraries showed the adequacy of references in the library, and the availability of laboratories as supporting facilities for TFP completion. Students of the Physics study program gave an excellent opinion on the three aspects asked, whereas the Chemistry study program students gave minimal opinion. The availability aspect of the library always gets a higher score than the other two aspects by students from all study programs, but showed the aspect of reference sufficiency available in the library is given the lowest score by students from most study programs. Overall for FMNS, only the availability aspect of the library was given a satisfactory or good category.
3.12. Quality of Internet Service

The quality of the internet asked to students includes parameters of availability, speed, and reliability (Figure 13). Figure 13 shows that only Physics Study Program students who think that internet quality (availability, speed, and reliability) in FMNS are very satisfying. The majority of students in each study program argue that the quality of the internet in FMNS still needs to be improved, primarily related to the parameters of speed and reliability.

Figure 12. Availability of library facilities and adequacy of references in the library as well as the availability of laboratories supporting TFP implementation in the opinion of students. Physics study program students gave a very satisfied or very adequate assessment for the three aspects of the facility asked while Chemistry study program students felt that the three aspects were still inadequate. The assessment of students from other study programs ranged from Physics and Chemistry study programs (see Figure 1 for the name of study programs).

Figure 13. Availability, speed, and reliability of the internet as supporting TFP implementation according to students. Physics study program students gave a very satisfactory assessment for the three aspects asked, far exceeding the value given by students from other study programs, while Chemistry study program students gave unsatisfactory ratings (see Figure 1 for the name of study programs).
3.13. The Most Ideal Semester to Begin TFP

Based on Figure 14, even though some students and lecturers have the opinion that TFP should begin in semester V or VI or even remain in semester VIII, but the majority of students and lecturers argue that an ideal semester to start TFP work is in semester VII. Furthermore, the opinion that an ideal semester to start a TFP is in the fifth semester most often appears to students compared to lecturers, as well as those who remain in semester VIII. Lecturers answered in a more moderate way through choices between semester VI and semester VII.

4. Discussion

4.1. Length of Study

The duration of the study period is the entire period of time used by students since officially accepted (registered) until they are declared graduated by a study program. The ideal study period for undergraduate programs completes 150 credits of study load for 192 weeks (8 semesters or four years). This study found that the average length of the study period for FMIPA Unimed was 214 weeks (8.9 semesters or 4.46 years). This finding is much shorter than the duration of study for undergraduate students in the Department of Automotive Engineering UNY in the 2011/2012 academic year (5.92 years), 2012/2013 (5.6 years) and 2013/2014 (5.1 years) [10], but a little longer if compared to the length of study period of the majority of Unnes students in 2014 to 2016, which was 4.1 years [13]. One of the long-term targets of FMNS Unimed is that in the next five years is that at least 50% of students must graduate on time (8 semesters or four years), and at least 75% of the
graduates must have a GPA of $\geq 3.00$. This means that within five years, FMNS Unimed must be able to shorten the current study period, which is 8.9 semesters or 4.46 years, to approximately eight semesters or four years.

The duration of the study period is largely determined by both internal factors and external factors of students. Internal factors are the most influential factors, such as intelligence, interest, and talent [14]. Interagency is the most dominant factor influencing student learning success compared to other factors [15]. Nevertheless, students who have high intelligence may not necessarily complete their studies on time because learning is a complex process with many factors that influence it, both academic and non-academic factors. Many students have high intelligence but do not study seriously, instead of working on too many non-academic activities, so that their academic assignments are neglected.

Other internal factors that influence the length of the study period are talents and interests. The selection of majors when registering should be in accordance with the wishes, talents, and interests of the students themselves, not because they have to. The wrong department will force students to meet with lecture material that is not in accordance with their interests and talents. As a result, students tend to get bored quickly, antipathy, and don't even want to learn. If this happens, it is likely that students will have difficulty completing their studies on time. The focus of this study is to revitalize the governance system and guidance of student TFP in doing final thesis assignments as an effort to improve the quality of graduates. In order to revitalize the governance and guidance system, the first step that must be taken is to re-examine (review) the current governance system. The selection of the focus of this research is based on the assumption that to achieve these targets and targets, FMNS is much easier to engineer external variables than to fix student internal variables such as intelligence, talent, and interests. One of the external factors that received the most attention in this study was the length of completion of the TFP. There are so many sub-variables that affect the success of completing the TFP for a long time, including the governance system (service) and the TFP guidance process, the availability, distribution, and function of supporting subjects, the involvement of students in lecturer research, and others.

4.2. Length of TFP Completion

The average length of completion of TAS by FMIPA students is 39 weeks (or 9.8 months or 1.6 semesters) with a range between 34 weeks study programs (Physics Study Program and Bilingual Program) and 53 weeks (Biology Education Study Program) (Figure 4.2A). If the old TAS completion data is associated with the total study load for the thesis (6 credits) and the total study load for the S1 program (150 credits) then the following information is obtained (Figure 2b):

a. The percentage of time needed to complete a TFP with a study load of 6 credits (or $6/150 \times 100\% = 4\%$ of the total study load) is 18%. The ideal number for this is 13%.

b. The percentage of time needed to complete the other study load is 144 credits (or $144/150 \times 100\% = 96\%$ of the total study load) is 82%. The ideal number for that is 88%.

c. The study program closest to the ideal number is the Physics and Bilingual Program (16% time for TAS: 84% for the course), while the study program which is the most deviated from the ideal number is Biology Education Study Program (25% time for TFP: 75% of the time for the course).

The three findings above indicate that the extension of the study period for FMNS Unimed students is generally caused by the length of the TFP completion period. FMNS students need 1.6 semester time (equivalent to 18% of the length of the study period) to complete a TFP with a study load of only 4%. Ideally, the TFP must be completed by students for one semester (13% of the study period). Other non-TFP courses totaling 144 credits can be completed by most students as scheduled by the study program or faculty each semester.

TFP is a course that requires direction and guidance from a lecturer because in planning and conducting research and making reports (ie, thesis), new problems will often emerge, which
sometimes students cannot solve it themselves. Therefore, in the completion of the TFP, assistance, advice, and solutions from the TS need to be given to students. Thesis guidance is the process of assisting by TS to students who are taking TFP to overcome problems that arise and provide direction related to planning, implementing, and reporting research.

TFP is given to train students to see the interrelationships and relationships between theory and practice. TFP is a scientific work prepared by students based on the results of a research problem that is carried out carefully with the guidance of a supervisor. The most effective way to connect theory and practice is to encourage students to learn based on inquiry that can be implemented in the field, studio, laboratory, in the classroom, real sites with community-related activities and employment [16,17]. Based on this understanding, undergraduate students (S1) are expected to benefit greatly from learning and deep understanding through active involvement in research, especially through inquiry-based learning. Departing from this understanding, most study programs require students to take TFP courses as one of the graduation requirements before completing their studies.

Variables that influence the completion of TFP include motivation to graduate on time, ability to write scientific papers, availability of learning resources, quality of guidance (by TS), and peer environment. Motivation of students to graduate on time [7–9], writing skills [7,9,18], availability of learning resources [7,9,11], the quality of guidance provided by the TS [9,12], and peer environment [9,12], both individually and jointly are the factors that influence the completion of the TFP.

High motivation to be able to graduate on time will encourage students to complete the TFP immediately. If this motivation is supported by the ability to write good scientific papers, the availability of learning resources, a good guidance process, and a good peer environment will have a very positive impact on completing the TFP. Conversely, if the motivation of students to graduate on time is low, writing skills are inadequate, it is difficult to find learning resources, and the quality of counseling is poor, and the peer environment is bad, it will have a negative impact on the completion of the TFP. As a result, students will graduate longer, and can even result in drop-outs (stopping in the middle of the road).

Other variables that affect students in completing the thesis are faculty policy in completing the thesis; second, constraints related to completing a thesis; and third, the business of students completing their thesis. The model or system of completion of the thesis, both in general and specifically, which applies to each university, is very varied [13]. Furthermore, the unavailability of references, the limitations of relevant research results, the inadequacy of laboratory facilities, the difficulty of finding difficult research problems, the limited knowledge and abilities of students, the limitation of research funds, facilities or learning devices that students have (such as computers) are very limited, the guidance process less optimal (TS is too busy, difficult to meet with TS), students have difficulty managing time, students are lazy and do not have the enthusiasm to work, difficulties in data collection and analysis, limited student knowledge about problems, differences of opinion between counselors and examiners are variable which can be an obstacle in solving the TFP [19].

The claim in completing TFP for S1 students are to carry out the research process correctly in accordance with applicable rules without having to find and correct existing theories. If students are able to take steps in the research activities in a sequence and correctly, the TAS has fulfilled the requirements. Thus, the level of difficulty in working on a TFP should not be too high for students.

The ability to write (scientific writing) is, of course, one of the factors that determine the completion of a TFP, because the TFP itself is a scientific paper based on research results. So that in order to be able to produce good scientific papers, students must have the knowledge and skills in writing, namely the ability to express thoughts, ideas, and ideas using a series of written languages that are good and correct and meet scientific rules or requirements. The better the ability of students in writing scientific papers, the easier it will be in completing the TFP, and conversely, the worse the ability is, the more difficult it will be for him to complete the TFP.

The next factor is the availability of learning resources. One of the rules in writing scientific papers is that scientific works are done on the basis of good theoretical studies. A theoretical study can only
be made if learning resources, such as reference material, are available and can be found and obtained. Therefore, the availability of learning resources is important in the process of completing TFP.

The length of time needed to pass these five stages (abbreviated as the length of the TFP completion) by FMNS students (i.e., the average for all study programs) is 40 weeks or ten months or 1.7 semesters (Figure 3a). The proportion of time required for each stage, respectively 14 weeks (or 35%) for stage I, four weeks (9%) for stage II, five weeks (13%) for stage III, ten weeks (25%) for stage IV, and seven weeks (19%) for stage V (Figures 3b and 3b). This means that stage I or the stage of proposal writing (35%) and stage IV or thesis writing stage (25%) is the most time-consuming stage. Both of these stages alone have consumed 60% of the total time for TFP, while the other three stages only spent 40% of the time available for TFP (Figure 3b). Ideally, the implementation phase (stage III) is the most time-consuming stage, but in this study, the implementation stage of this study only requires an average of 5 weeks or 13% of the time needed for the entire TFP.

The above fact clearly shows that the dominant variable that causes the length of the completion of TFP is the problem of the speed of writing scientific writings, namely proposals and reports on the results of research (or thesis) on students. Students are very slow or require a very long time in writing proposals and thesis. It becomes very reasonable to question why do students need a very long (or very slow) time to write proposals and thesis?

According to [20], these problems can be caused either by internal factors such as lack of interest or motivation in students and low academic ability to issue problems or ideas, as well as external factors such as the difficulty of the material or title of the thesis done, difficulty in getting literature or data and problems (communication) with TS. Since internal factors are not the focus of this research, what needs to be highlighted is the possibility of external factors related to governance and guidance systems as the variables that cause the slow pace of FMNS students in writing proposals and thesis.

Regarding external factors, communication problems and the quality of guidance services provided by TS cannot be considered to be one of the factors causing students to write proposals and theses because the majority of students expressed satisfaction and were very satisfied with the quality of TS guidance services (Figure 8).

4.3. Quality of TS Service

TS service quality or the quality of TFP completion guidance is the level or level of good or bad the process of assisting by TS lecturers to students to avoid difficulties during the completion of the TFP. Therefore, the quality of guidance has a positive influence on the completion of TFP; the better the quality of guidance, the better and faster the completion of the TFP. On the contrary, the worse the quality of guidance, the worse the completion process of the TFP that is being pursued by the student concerned.

The stages of completion of the TFP in this study are divided into the stages of proposal writing, proposal revision (after the seminar), conducting research, writing the thesis, and revising the thesis stage (after the thesis exam). At each stage, the Thesis Supervisor (TS) is actively and continuously must provide service or guidance. If the TS service is not good, then the time needed by students to complete these stages will be even longer.

This study found that there were quite wide variations in the length of completion of the TFP between study programs, where Mathematics Study Program students needed the longest time (53 weeks or 2.2 semesters) while the Chemistry Study Program and Bilingual Program needed the shortest time (34 weeks or 1.4 semesters) to complete all four TFP stages (the average for PMNS is 39 weeks or 1.6 semesters (Figure 3a). The largest proportion of time is spent by students when writing proposals (average 35% of TFP completion time, range 27 - 41%), while the time for conducting research in the field or laboratory is only 13% (range of 10-25%) Ideally, the proportion of time for the implementation phase of the study must be greater (longer) compared to the time to carry out the stages of the TFP this fact. Namely, the number of time students spend writing a proposal, shows that there are problems in writing scientific work on the part of students, especially students at generally stated that they highly appreciated the guidance services provided by the TS (Figure 4) and
only a small number of students stated that they were dissatisfied (Figure 5) on the quality of services (guidance) provided by the TS. This really needs attention and improvement.

Empirical data shows that TS contributed 50% for the determination of topics and research themes, 40.5% for proposal preparation, 38.9% for preparation of instruments, 46.4% for preparation of reports (thesis), and 24.6% for presentation in the thesis exam [19].

The quality of TFP guidance can be seen from several aspects, including (a) suitability of duties as TS with education, expertise, experience, and abilities, (b) quantity and continuity of guidance, (c) suitability of guidance programs with needs, (d) situations and conditions during guidance, (e) thesis guidance methods and techniques, and (f) thesis guidance equipment and equipment. A TS can be categorized as good if easily found by students, has a commitment to agreement guidance, adequate consultation time is provided, mastering topics and research methods, mastering the standard of thesis writing, having the willingness to encourage and encourage students, willingness and ability to find solutions to problems. In this study, the main focus was on aspects of friendliness, motivation, and attention given to students. Of the three major groups of indicators (aspects), the aspects of friendliness and aspects of willingness to motivate are very dominant as determinants of student satisfaction in responding to the guidance services provided by TS (Figure 8).

4.4. Administrative Services
In this study, there are two main issues relating to administrative services that are asked, namely the availability and clarity of the instruments (instruments) of administration and the quality of services provided by education staff (employees) in FMNS. Regarding the availability of supporting facilities at FMNS, there was a very large variation between study programs in terms of student assessment. Students of Biology and Chemistry study programs stated they were not satisfied while students from other study programs expressed satisfaction (Figure 4).

According to [21], service quality is the totality of the characteristics of goods and services that show their ability to satisfy customer needs, both those that appear clear and hidden. The success of FMNS in achieving its vision and mission is mostly determined by the quality of services it provides to all stakeholders, especially students.

4.5. Ideal Semester for TFP Work
The majority of students and lecturers are of the opinion that the ideal semester to start work on TFP is in semester VII, although even a small number of them think that TFP should have started in semester V or VI or remain in semester VIII (Figure 4.14). At present, TFP is placed and begins to be done in semester VIII. With this situation, only a small (very small) number of students can complete their studies in exactly eight semesters, the majority of new students can complete their studies in the ninth semester (average length of study period 8.9 semesters, see discussion in Section 4.2.1) with the average completion period of 1.6-semester TFP (see discussion in Section 4.2.2). Seeing this reality, and paying attention to the complexity of the stages of completion of the TFP, considering the conditions of library, internet and laboratory facilities that still require greater attention, and a large number of students compared to the number of supervisors (TS), it makes perfect sense if the TFP begins in VII semester. It is expected that in the seventh semester, at least students have completed the seminar and revised the proposal so that the research and writing of the research report (thesis) can be completed in the eighth semester. This condition is expected to improve the quality of the thesis written and, at the same time, shorten the student's study period to exactly eight semesters. Besides that, putting TFP in the seventh semester will provide an opportunity for exceptional students to be able to complete their studies in only seven semesters, one semester shorter than the normal study period.

5. Conclusion
The average length of the study period of FMNS of Unimed students (8.9 semesters) is still far from the ideal study period (8 semesters). One of the important factors that led to the extension of the study
period was that the length of time required by students to connect to the Thesis Final Project (TFP), namely an average of 1.6 semesters. Some of the obstacles faced by students during completing the TFP related to the governance of TFP scanners, including administrative services that are still not optimal, and supporting facilities (such as SOPs, Guidebooks, internet, references in libraries, and laboratory facilities) still cannot be fully utilized. In addition, the function and role of supporting subjects to work on TFP (especially English and Statistics courses) have not been felt and utilized by students well. Finally, the position of the TFP placed in the seventh semester was felt by students, and also by lecturers, a little late. Based on these findings, several improvements were made in the TFP governance and guidance system in order to shorten the study period and improve the quality of FMNS of Unimed graduates, as follows: (a) increasing content relevance (breadth, depth, and practicality) of thesis supporting subjects (b) updating and completing SOPs, Guidebooks, Guidance Cards, Logbooks, and Administrative Procedures TFP becomes more practical, efficient and effective, (c) increasing adequacy and optimizing the functions of supporting facilities (such as books, references, internet) and creating an atmosphere that conducive to conducting research in the laboratory, and repositioning TFP courses one semester earlier (i.e., starting in semester VII) from the current position in semester VIII. Besides that, training students early to search and use references (for example, through the implementation of 6 tasks) and conducting research in schools, fields, or laboratories (by involving students in lecturer research or implementing Student Creativity Programs) will be very helpful.

6. Acknowledgement
Thanks to the State University of Medan for the research grant provided for the implementation of this research, in the Faculty and Institution Management Research scheme, according to Contract Number 206A/UN33.8/2017 dated August 7, 2017. Thanks also addressed to all staffs and students involved in the distribution of questionnaires and data input of this research.

References

[1] Motlan, Sinuraya J and Tarigan R 2012 Pengaruh Metode Inkuiri Berbasis Blended Learning Dan Kreativitas Belajar Terhadap Hasil Belajar Mahasiswa Pada Mata Kuliah Fisika Umum I Di FMIPA UNIMED J. Penelit. Bid. Pendidik. 18 72
[2] Sinuraya J B, Motlan and Tarigan R 2012 Inovasi Strategi Pembelajaran Berbasis Metode Inkuiri Dan Blended Learning Prodi Pendidikan Fisika FMIPA UNIMED J. Online Pendidik. Fis. 1 17–25
[3] Panggabean D D, Irfandi I, Sinuraya J and Sinuraya J 2017 Improving of The Student Learning in Lectures of General Physics I by Collaborative Learning Model Based on Saintific Approach J. Pendidik. Fis. Indones. 13 94–101
[4] Sinuraya J, Simatupang S, Wahyuni I and Wahyuni I 2014 Pengembangan Perangkat Pembelajaran Berbasis Masalah Untuk Peningkatan Capaian Kompetensi Fisika Umum I Mahasiswa Prodi Pendidikan Fisika FMIPA Universitas Negeri Medan J. Pendidik. Fis. Indones. 9
[5] Nurdin B, Nurdin B, Jurubahasa S and Ratelit T 2013 Pemanfaatan Sumber Belajar Berbasis Contextual Teaching And Learning Dalam Upaya Peningkatan Kualitas Pembelajaran Fisika Umum I J. Pendidik. Fis. Indones. 1
[6] FMIPA UNIMED 2016 Borang Akreditasi Fakultas Matematika dan Ilmu Pengetahuan Alam (Medan)
[7] Purwanto M N 2007 Psikologi Pendidikan (Bandung: PT Remaja Rosdakarya)
[8] Kusnendar F 2013 Analisis Penghambat Penyelesaian Studi Mahasiswa S1 Program Studi Pendidikan Teknik Mesin Jurusan Pendidikan Teknik Dan Kejuruan Fakultas Kejuruan Dan Ilmu Pendidikan Universitas Sebelas Maret Surakarta J. Ilm. Pendidik. Tek. Mesin 1
[9] Hartanto U 2016 Faktor-faktor yang Mempengaruhi Penyelesaian Tugas Akhir Skripsi (TAS) Mahasiswa Program Studi Pendidikan Akuntansi Fakultas Ekonomi Universitas Negeri
Yogyakarta Angkatan 2011 (Universitas Negeri Yogyakarta)

[10] Siswanto I 2015 Program Percepatan Penulisan Tugas Akhir Skripsi Mahasiswa Jurusan PT. Otomotif FT UNY Prosiding Seminar Nasional Pendidikan Teknik Otomotif UMP (Yogyakarta) pp 2338–0284

[11] Alafgani A P 2013 Faktor-faktor Kesulitan dalam Menyelesaikan Mata Kuliah Tugas Akhir (Universitas Pendidikan Indonesia, Bandung)

[12] Irham M and Wiyani N A 2014 Psikologi Pendidikan (Yogyakarta: Ar-Ruzz Media)

[13] Hariyadi S, Anto A H F and Sari W A 2017 Identifikasi Faktor-Faktor Yang Mempengaruhi Penyelesaian Skripsi Pada Mahasiswa S1 Psikologi Di Kota Semarang J. Penelit. Pendidik. 34 155–60

[14] Rusmawati K R, Tripalupi L E and Artana M 2014 Faktor-Faktor Yang Mempengaruhi Terhambatnya Penyelesaian Studi Mahasiswa Jurusan Pendidikan Ekonomi Tahun 2012/2013 J. Pendidik. Ekon. Undiksha 4

[15] Slameto 2010 Belajar dan Faktor-Faktor yang Mempengaruhi (Jakarta, Indonesia: Rineka Cipta)

[16] Healey M 2013 Active Learning and Student Engagement (London: Routledge)

[17] Lee V S 2012 What is inquiry-guided learning? New Dir. Teach. Learn. 2012 5–14

[18] Siswanto I and Sampurno Y G 2015 Faktor-Faktor Penghambat Pengerjaan Tugas Akhir Skripsi Mahasiswa Pendidikan Teknik Otomotif Ft Uny Taman Vokasi 1

[19] Wiyatmo Y, Mundilarto S, Nasional E W-P S and 2010 undefined 2010 Efektivitas Bimbingan Tugas Akhir Skripsi (TAS) Mahasiswa Jurusan Pendidikan Fisika FMIPA UNY Prosiding Seminar Nasional Penelitian, Pendidikan dan Penerapan MIPA (Yogyakarta: MIPA, Universitas Negeri Yogyakarta)

[20] Goh C C . 2000 A cognitive perspective on language learners’ listening comprehension problems System 28 55–75

[21] Kotler P 2000 Marketing Management (Edisi Bahasa Indonesia) (Jakarta, Indonesia: PT. Prehallindo)