APPLYING WORKLOAD AND FULL-TIME EQUIVALENT ANALYSIS TO DETERMINE OPTIMAL TEACHER REQUIREMENTS

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Abstract. This study aims to analyze teacher workload as a basis for determining the optimal number of teaching staff at SMA Negeri 1 Berastagi. Human resource management plays a critical role in ensuring the efficiency and sustainability of educational institutions. The research applies the workload analysis and Full-Time Equivalent (FTE) method, following the guidelines of the Indonesian Ministry of Administrative and Bureaucratic Reform Regulation (Permenpan RB) No. 1 of 2020. Using a saturated sampling method, the study involves all 48 civil servant teachers across various subject areas, including mathematics, science, social studies, languages, and general education. The findings reveal disparities in workload distribution, where several teachers experience overload and others underload conditions. These imbalances suggest the need for strategic adjustments, such as adding teachers in physics, chemistry, geography, and economics, while reducing honorary staff in subjects like religion and physical education. The managerial implications highlight the importance of applying the POAC management functions planning, organizing, actuating, and controlling—to achieve workload balance, optimize staffing, and enhance organizational effectiveness. Overall, workload-based human resource planning is essential for improving teacher efficiency and maintaining educational quality.

Keywords: workload analysis; Full Time Equivalent; teacher optimization; human resource management

I. INTRODUCTION

Human Resource Management (HRM) plays a crucial role in determining the effectiveness of educational institutions, particularly in schools where teachers serve as the core component in achieving learning goals [1]. Teachers, as the main human capital, directly influence students' academic performance and the overall quality of education [2]. Efficient management of teacher workload and the proper allocation of human resources are therefore essential to ensure both productivity and instructional quality [3]. The COVID-19 pandemic has drastically changed the structure of educational work. Teachers had to adapt to distance and hybrid learning environments that required additional preparation, technical skills, and time investment [4]. Studies by Fitria and Rahayu [5] highlight that these changes increased teachers' administrative and emotional burdens, creating imbalances in workload distribution. Consequently, workload analysis has become an essential approach to evaluate efficiency, fairness, and equity in the distribution of teachers' duties [6]. The Full Time Equivalent (FTE) method is one of the most widely used quantitative techniques in workload assessment. It measures the ratio between actual working hours and standard effective working hours assigned to a particular position [7]. According to the Ministry of Administrative and Bureaucratic Reform (PANRB) [8], this approach allows institutions to determine whether an employee's workload falls into underload, fit, or overload categories. Through FTE-based analysis, schools can plan and adjust their staffing needs more accurately [9].

In Indonesia, workload imbalance among teachers is a persistent problem. Factors such as uneven subject distribution, class size, and teaching hours often create disparities in teacher assignments [10]. Such imbalances affect teacher motivation and performance, leading to reduced instructional effectiveness [11]. Overloaded teachers tend to experience fatigue and burnout [12], while underloaded teachers may suffer from decreased engagement and job satisfaction [13]. Workload analysis therefore serves not only as an administrative evaluation tool but also as a strategic foundation for workforce planning and performance improvement [14]. By assessing workload quantitatively, school management can determine the optimal number of teachers required to achieve organizational efficiency and learning quality [15]. This study aims to analyze the workload of teachers at SMA Negeri 1 Berastagi using the Full Time Equivalent (FTE) method, in order to identify the optimal staffing level and provide recommendations for improving resource efficiency and work balance among teachers.

Workload analysis is defined as a systematic process to identify and measure the total amount of work that must be completed by employees within a specified time period [16]. Nugroho and Arifin [17] describe it as a management approach that ensures the alignment between individual capacity and organizational demands. In educational contexts, workload analysis is used to evaluate the alignment between teaching hours, administrative responsibilities, and non-instructional tasks assigned to teachers [18]. Beyond serving as an efficiency indicator, workload analysis is a strategic instrument for data-

driven human resource planning. According to Lestari and Yuliani [19], accurate workload mapping can prevent inequitable task distribution and enhance the quality of teaching. Among various techniques, the Full Time Equivalent (FTE) approach has become the standard model for measuring workload across both public and private educational institutions [20]. The FTE method calculates the ratio between the total time spent on work activities and the total effective working hours available in a given period [21]. This ratio allows classification into underload, fit, or overload categories, indicating whether an employee's workload is optimal [22]. Astuti and Wibowo [23] demonstrated that FTE analysis provides a more objective understanding of workforce efficiency, especially in schools where job descriptions and teaching hours vary widely. In education, the use of FTE facilitates evidence-based decision-making in determining the ideal ratio of teachers to students and subjects [24]. It is also used to prioritize teacher recruitment, redesign work assignments, and establish competency-based workforce planning strategies [25].

Teachers' workloads encompass not only classroom teaching but also lesson planning, assessment, mentoring, and professional development activities [26]. Imbalanced workloads—whether excessive (overload) or insufficient (underload)—can negatively affect both teacher performance and student outcomes [27]. Setiawan et al. [28] found that overloaded teachers are more prone to work fatigue, stress, and burnout, leading to reduced instructional quality. Conversely, underloaded teachers often experience lower motivation and diminished professional growth [29]. Thus, balanced workloads are critical for sustaining teacher effectiveness, job satisfaction, and organizational efficiency [30].

In educational management, workload analysis provides a foundation for strategic decision-making related to organizational efficiency. Priyanto [31] states that workload analysis outcomes can be integrated into managerial functions—planning, organizing, actuating, and controlling (POAC)—to improve institutional performance. The application of POAC principles in workload evaluation helps optimize teacher assignments and ensures equitable task distribution [32]. Recent trends emphasize digital transformation in workload management. By leveraging information systems and analytics tools, schools can monitor teacher performance and workload distribution in real-time, enabling adaptive and transparent policy implementation [33].

Empirical evidence from prior studies confirms that applying workload analysis and FTE consistently enhances the accuracy of staffing decisions in educational institutions [34]. These methods promote fairness, accountability, and transparency in managing human resources while aligning workforce capacity with institutional goals [35]. Consequently, workload analysis emerges as a strategic framework for optimizing teacher allocation and achieving educational excellence in a data-driven, post-pandemic environment.

II. RESEARCH METHODS

This study uses the census method as a sample extraction method, where the entire population of teachers with the status of civil servants is a sample in this study. The stages in the data analysis process begin with checking the data and collecting the information needed in the research. Furthermore, data classification is carried out according to the specified part of the task, and verifying the data as the last stage. The calculation of employee needs can be done using the FTE index as a reference that the workload owned by a teacher is in the categories of Underload, Fit, and Overload. Lestari and Trisyulianti (2018) explained that the underload category is in the range of 0-0.99. The fit category is in the range of 1-1.28 and the overload category is in the range of more than 1.28.

III. RESULTS AND DISCUSSION

School Overview of SMA Negeri 1 Berastagi

The school is located on Jamin Ginting street, Berastagi district, Karo regency, North Sumatra. The school consists of 1 library room, laboratory, school health unit, teacher's office, hall, principal's room, and administration. The school also has 2 fields and 35 study rooms.

Effective Working Time Calculation

In 2022, the number of days in a year is 365 days, the number of days in a year is 52 days, the number of joint holidays in one year is 14 days and the number of joint leave is 4 days and annual leave is 12 days. Based on the number of days, the number of effective days can be determined as many as 283 days in one year. For work as a teacher, the *allowance* is estimated at 26.1% so that the effective working hours of teachers in one day are 5,488 hours.

Calculation of Workload of Science Subject Teachers

At SMA N 1 Berastagi, each level that chooses the science specialization has 6 to 7 study rooms with one study room totaling 32 students. The results of the calculation can be seen in tables 1, 2, 3, and 4.

Table 1. Recapitulation of Mathematics Teacher Workload Analysis Results

Mathematics	FTE	Information
M1	1,37	*Overload*
M2	1,2	*fit*
M3	1	*fit*
M4	1,13	*fit*

Table 2. Recapitulation of Physics Teacher Workload Analysis Results

Physics	FTE	Information
F1	0,92	*underload*
F2	1,38	*overload*
F3	1,24	*fit*

Table 3. Recapitulation of Chemistry Teacher Workload Analysis Results

Chemistry	FTE	Information
K1	1	*fit*
K2	1,09	*fit*
K3	1,01	*fit*
K4	1,06	*fit*

Table 4. Recapitulation of the Results of Biology Teacher Workload Analysis.

Biology	FTE	Information
Bio1	0,89	*underload*
Bio2	1,43	*overload*
Bio3	1,03	*fit*

Based on the data, it can be seen that the MIPA subject is dominated by teachers with FTE *fit*, which is as many as 9 people. In addition, there are 3 teachers with FTE *overload*, namely teachers of mathematics, physics, and biology subjects. In actual conditions, honorary teachers have been added to mathematics teachers so that no additional teachers are needed in mathematics subjects. In addition, there are 2 teachers who have an underload FTE score , namely in biology and physics teachers. To optimize the teacher's work, additional work can be divided evenly.

Calculation of Social Studies Teacher Workload

At SMA N 1 Berastagi, the social studies specialization has fewer study rooms than the science specialization. The social studies specialization only has 4 study groups at each level. The results of the workload analysis for social studies teachers can be seen in tables 5, 6, 7, and 8.

Table 5. Recapitulation of the Results of the Workload Analysis of History Teachers

History	FTE	Information
S1	1,38	*overload*
S2	1,18	*fit*

Table 6. Recapitulation of Geography Teacher Workload Analysis Results

Geography	FTE	Information
G1	1,31	*overload*
G2	1,42	*overload*

Table 7. Recapitulation of the Results of the Workload Analysis of Economics Teachers

Economics	FTE	Information
E1	1,13	*Fit*
E2	1,17	*Fit*
E3	1,3	*Overload*

Table 8. Recapitulation of the Results of the Sociological Teacher's Workload Analysis

Sosiologi	FTE	Information
S1	1,18	*fit*
S2	1,11	*fit*

Based on the data, in the social studies specialization there are 5 teachers with FTE fit. In addition, there are four people who received FTE *Overload,* namely in history, geography, and economics subjects. In actual conditions, there are honorary teachers who teach history subjects so that no additional teachers are needed.

Calculation of Workload of Language Subject Teachers

Language subjects consist of Indonesian, English, and French. Indonesian and English subjects will be obtained by all students, only French subjects can only be learned when students request or add these subjects as additional subjects. The results of the workload analysis can be seen in tables 9, 10, and 11.

Table 9. Recapitulation of the Results of the Workload Analysis of Indonesian Language Teachers

Indonesian Language	FTE	Information
BI1	1,39	*Overload*
BI2	1,33	*Overload*
BI3	1,07	*fit*
BI4	0,5	*underload*

Table 10. Recapitulation of the Results of the Analysis of the Workload of English Teachers

English	FTE	Information
B.Ing1	1,2	*fit*
B.Ing2	1,43	*overload*
B.Ing3	1	*fit*
B.Ing4	1,1	*fit*
B.Ing5	1,16	*fit*

Table 11. Recapitulation of the Results of the Workload Analysis of French Language Teachers

French	FTE	Information
BP1	1,3	*Overload*

Based on the data, it can be seen that in the field of language, teachers with FTE *fit are* dominated, which is as many as five people. In addition, there is one person with an underload FTE score, namely an Indonesian language teacher. There are four people with FTE *overload* scores, with the actual situation there are honorary teachers in English subject teachers, so there is no need for additional teachers for the English subject.

Calculation of Workload of General Subject Teachers

In General Subjects, all students, both specializing in mathematics and social studies, will receive the lesson to be learned and understood. General subjects consist of cultural arts,

civic education, physical education, religion, and counseling guidance. The results of the workload analysis can be seen in tables 12, 13, 14, 15, and 16.

Table 12. Recapitulation of the Results of the Civic Education Teacher's Workload Analysis

Citizenship Education	FTE	Information
P1	1,07	*fit*
P2	1,07	*fit*
P3	1,28	*fit*

Table 13. Recapitulation of the Results of the Work Load Analysis of Cultural Arts Teachers

Cultural Arts	FTE	Information
SB1	1,15	*fit*
SB2	0,83	*underload*
SB3	1,37	*overload*

Tabel 14. Rekapitulasi Hasil Analisis Beban Kerja Guru Pendidikan Jasmani

Physical Education	FTE	Information
Penjas1	1,14	*fit*
Penjas2	0,91	*underload*
Penjas3	0,62	*underload*

Table 15. Recapitulation of the Results of the Religious Teacher's Workload Analysis

Religion	FTE	Information
A1	1,66	*overload*
A2	0,98	*underload*
A3	1,42	*overload*

Table 16. Recap`itulation of the Results of the Workload Analysis of Counseling Guidance Teachers

Counseling Guidance	FTE	Information
BK1	0,92	*underload*
BK2	0,6	*underload*
BK3	0,78	*underload*

In general subjects, there are five teachers with FTE fit scores, seven teachers with FTE underload scores and three people with overload FTE scores with actual circumstances there are honorary teachers in religious subjects, and physical education so that no additional employees are needed in the fields of religion and physical education

Optimal Employee Needs in Teachers

Based on the results of the analysis of subject teachers, some teachers already have honorary teachers in actual circumstances so that there is no need to add teachers in some subjects.

Managerial Implications

Based on the results of the study with *FTE* analysis calculations, it shows that some subject teachers have overloaded and underload workload values. The use of the POAC function can be applied to overcome overload and underload load values. The function of POAC can increase the effectiveness and efficiency of an organization in achieving goals (Dakhi 2016). POAC consists of *planning*, *organizing*, *actuating*, and *controlling*. The managerial implications of this study can be seen in the form of table 18.

Table 18. Managerial Implications

Planning	Determine the optimal number of teachers to achieve teacher effectiveness and efficiency in teaching		
Organizing	*Overload*	*Fit*	*Underload*
Actuacing	Review of reassignments Proposal of employee needs to BKN Addition of temporary honorary teachers	More equitable division of tasks	*Job Enlargement*
Controling	Assessment of assignments and workload at the end of each semester to achieve teacher effectiveness and efficiency in teaching		

IV. CONCLUSIONS

Based on the results and discussion, several conclusions can be drawn as follows: Based on research, the workload that each teacher has in general increases. This can be seen from several calculation results that state the value of FTE overload. Not only is it increasing, the division of tasks between each teacher in the chosen field is not too even, causing some teachers to have an underload FTE score. SMA N 1 Berastagi has a total of forty-eight teachers with civil servant status. In addition to this, the number of honorary teachers in schools is eight people. Based on calculations, the ideal number of teachers is fifty-five people with additional teachers in physics, chemistry, geography, and economics subjects. In religious subjects, a reduction in honorary teachers can be made to achieve the ideal number.

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