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Effectiveness of I-SLT in Determining Student Learning Time

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Abstract

Student Learning Time (SLT) aims to a balance under- and overloading students by focusing on the total time required to achieve learning objectives, beyond just classroom hours. i-SLT is a SLT calculator that utilizes the visual basic for application features in Microsoft Excel. The main advantage of i-SLT is the capability to include unlimited teaching and learning (T&L) components (for both conventional and online learning) for the SLT calculation. It is highly flexible, enabling users to easily add or delete components and set the course duration. Components can be defined in four units: hours, minutes, numbers, or pages. i-SLT calculates contact time, independent learning time, and total SLT for each component, and provides detailed breakdowns, including percentages of practical vs. theoretical learning, conventional vs. online learning, and synchronous vs. asynchronous learning. To facilitate the blended learning culture, the i-SLT can also display the indicator whether the course achieves the Supportive Blended Learning or the Substitute Blended Learning status. With a proper usage of i-SLT, users can confidently show the actual loading of each course by taking consideration of all the T&L elements and components.

Keywords: Student Learning Time, SLT Calculator, Effective Learning, Blended Learning, Student Loading

Introduction

In contemporary education, the effective management of student learning time (SLT) is a critical factor in ensuring both academic success and student well-being. SLT refers to the total amount of time a student is expected to spend on various learning activities, both inside and outside the classroom, that contribute to achieving the learning objectives of a course. This encompasses a wide range of activities, including direct instruction, individual study, group work, and practical application of knowledge. Properly structured SLT ensures that students are neither under-challenged nor overwhelmed, striking a balance that fosters optimal learning outcomes.

The concept of SLT is more than just a metric for classroom hours; it is a holistic approach to understanding the entirety of a student's engagement with their educational experience. As (Mohamed, 2006) highlights, SLT includes all the components and activities necessary for students to meet the educational goals of a course. This comprehensive view of learning time is essential for creating effective pedagogical strategies that align with the diverse needs of students. The goal is to provide students with ample opportunities to engage with course material while avoiding the pitfalls of either under-burdening or over-burdening them.

Literature Review

In the dynamic landscape of education, finding the delicate balance between providing students with sufficient opportunities for learning and avoiding overwhelming them with excessive demands is essential for fostering academic success and well-being. It is critical to avoid under-burdening and over-burdening the students. Under-burdening occurs when students are not adequately challenged or engaged in meaningful learning activities, leading to disinterest, apathy, and stagnation in academic progress. Conversely, over-burdening occurs when students are overwhelmed by excessive academic demands, leading to stress, anxiety, and burnout (Liu & Huang, 2021).

Proper understanding of SLT helps educators identify areas where students may be underutilizing their time or lacking opportunities for intellectual growth and development(Gromada & Shewbridge, 2016). By assessing the distribution of learning tasks, assignments, and activities across various topics, educators can ensure that students are sufficiently challenged and stimulated to achieve the learning outcome. Proper calculation of SLT also plays a crucial role in identifying instances where students may be juggling multiple commitments or facing unrealistic expectations, thereby enabling educators to implement strategies to mitigate the risk of over-burdening.

Amid the COVID-19 pandemic, there was a sudden and widespread transformation across various sectors, including societal, institutional, and individual levels. Many educational institutions shifted from traditional teaching methods to online platforms. Consequently, institutions have been actively working to establish effective online teaching and learning strategies. One of the key strategy is to have appropriate SLT setting for online learning. (Pardeshi, Gawade, & Hemant, 2022).

This paper presents a user-friendly and comprehensive SLT calculator called i-SLT that can be used to accurately calculate the SLT for any course. i-SLT has been developed and used in Universiti Malaysia Perlis (UniMAP) since 2021. It has been made compulsories for all instructors/lecturers in UniMAP to use i-SLT to calculate the SLT for their course and present during the teaching plan presentation session. The following section covers the features and functionality of the i-SLT.

I-SLT Features and Functionalities

i-SLT is a tool designed to facilitate academic staff to plan their teaching activities and properly calculate the SLT for their students. Utilizing the versatile Visual Basic for Applications (VBA) capability within Microsoft Excel, this calculator is designed to be very flexible, comprehensive, and accurate. With user friendly design and customizable features, i-SLT simplifies the process of calculating the SLT, ensuring every activity and minute counts

towards the SLT calculation. The proper calculation of student learning time is essential for preventing students from being under-burdened or over-burdened in their academic pursuits. The features and functionality of i-SLT will be discussed in the following subsections.

a) I-SLT Interface

When users open the i-SLT file, they will be directed to the welcome page which is the Main worksheet as shown in Figure 1. In this worksheet, there are two buttons to generate the i-SLT calculator worksheet, the details instruction on how to use the i-SLT and the version history of the i-SLT. User can select the blue button to create SLT Calculator consisting of standard 19 weeks (14 weeks of study, 1 mid-term break, 1 study week and 3 examination weeks). Alternatively, user can select the orange button and specify number of weeks that they one (minimum is 2 weeks). Part of the i-SLT calculator is shown in Figure 2.

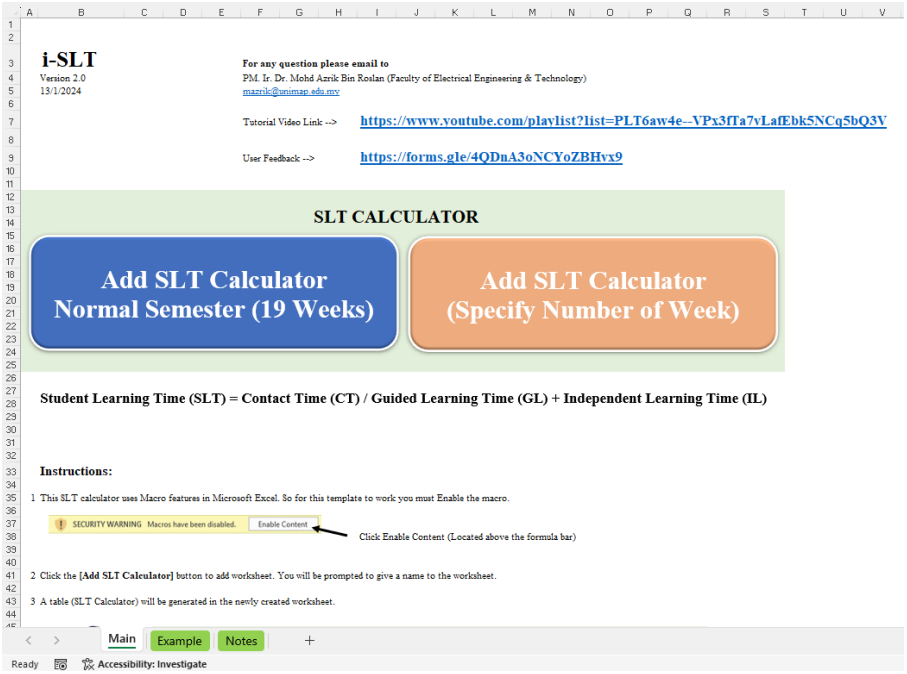

Figure 1: I-SLT Welcome Page

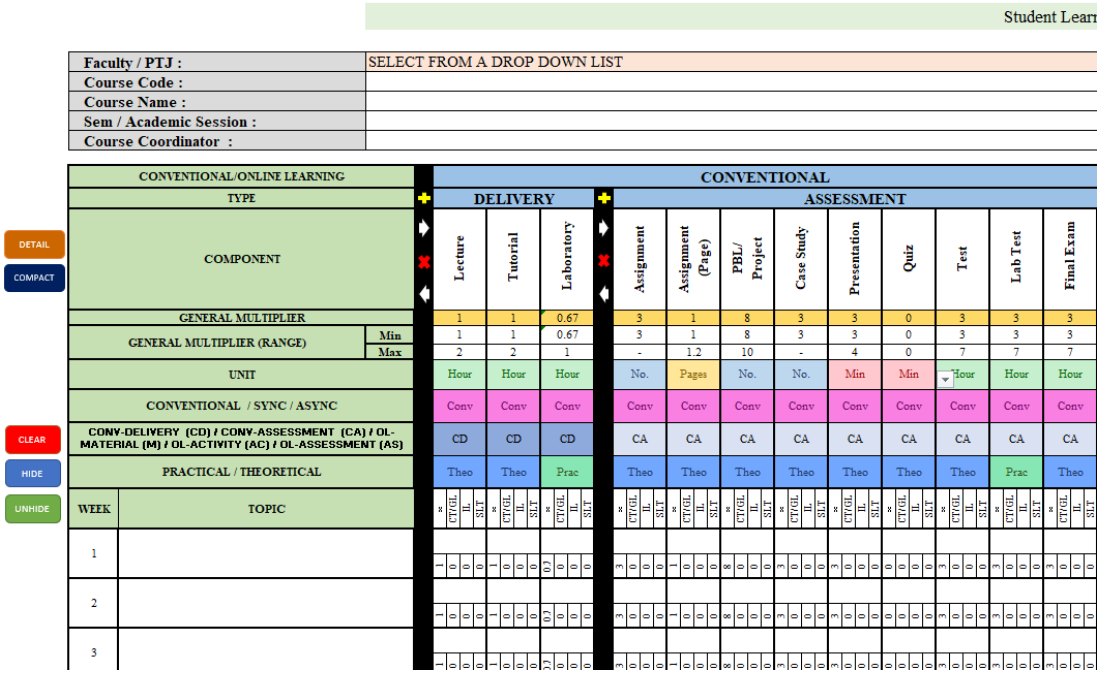

Figure 2: I-SLT Calculator

b) Teaching and Learning Components

Teaching and learning (T&L) components (such as lecture, tutorial etc) in i-SLT are classified into 5 categories which are:

- Conventional Delivery
- Conventional Assessment
- Online Learning Material
- Online Learning Activity
- Online Learning Assessment

The classification is done in that manner to follow the guideline by the Ministry of Education (MOE). In (MOE, 2020), the online learning components are divided into material, activities and assessment and there are certain ratios that must be met by each course to achieve the Pembelajaran Teradun Gantian (PTG) status.

By default, commonly used T&L components are already added to each of the category. However, if the user wants to add a new component, they can do it by a click of a button. Depending on the nature of the component, user can set the general multiplier (for independent learning time calculation), the unit of calculations (Hour, Min, No. or Pages), implementation method (conventional, synchronous or asynchronous) and the type (practical or theoretical).

c) SLT Calculation in I-SLT

The SLT for each T&L component is calculated based on the following formula:

$$SLT = CT(or\ GL) + IL \quad (1)$$

where CT is the contact time, GL is the guided learning time and IL is the independent learning time. Not all T&L components has CT/GL. Component in which students need to interact with their instructor such as face-to-face lecture or tutorial has CT/GL. Students also need to spend time for their preparation before the session and revision after the session and this will be considered as their IL. Component such as assignment and mini project do not have CT as they are not required to meet the instructor. The time they spent to finish the component will be considered as their IL.

Table 1 shows the different calculation of SLT when different component unit is selected. For the unit of Hour and Minute, the SLT will consist of CT/GL and IL. For the component that does not have the CT/GL, the unit No. and Pages can be selected.

Figure 3 shows how the i-SLT calculates the SLT for four different types of components (each of them using different units). User must enter the quantity of the component based on the unit selected. i-SLT will calculate the CT/GL, use a multiplier value (x) to calculate the IL and calculate the SLT for each component. The unit for CT/GL, IL and SLT is in hour.

The general multiplier used for the preset components are mostly based on the guideline given by the Malaysian Qualifications Agency (MQA), MOHE and Malaysian Institutions of Higher Learning (IHL) (MOE, 2018). By default, the general multiplier value for each component will be applied to all the weeks available under the component. However, users can change the multiplier for any week if they want. This is useful in the case where the assignment given in one week is harder and students need to spend more time to complete it.

Table 1
Different Calculation of SLT for Different Component Unit

COMPONENT UNIT	CONTACT TIME (CT) / GUIDED LEARNING TIME (GL)	INDEPENDENT LEARNING TIME (IL)	STUDENT LEARNING TIME (SLT)
Hour	✓	✓	SLT = [CT/GL] + [IL]
Minute	✓	✓	SLT = [CT/GL] + [IL]
No.	X	✓	SLT = [IL]
Pages	X	✓	SLT = [IL]

CONVENTIONAL/ONLINE LEARNING		CONVENTIONAL															
TYPE		ASSESSMENT															
COMPONENT		Assignment				Essay				Presentation				Final Exam			
GENERAL MULTIPLIER		3				1				3				3			
UNIT		No.				Pages				Min				Hour			
WEEK	TOPIC	x	CT/GL	IL	SLT	x	CT/GL	IL	SLT	x	CT/GL	IL	SLT	x	CT/GL	IL	SLT
1	SLT Calculation Example	1				10				30				3			
		3	0	3	3	1	0	10	10	3	0.5	1.5	2	3	3	9	12

Component	Unit	Qty (a)	Mult (x)	CT/GL (hour) (b)	IL (hour) $(c)=(a)\times(x)$	SLT (hour) $(d)=(b)+(c)$
Assignment	No.	1	3	$CT/GL=0$	$IL=1\times3=3$	$SLT=0+3=3$
Essay	Pages	10	1	$CT/GL=0$	$IL=10\times1=10$	$SLT=0+10=10$
Presentation	Min	30	3	$CT/GL=\frac{30}{60}=0.5$	$IL=\frac{30}{60}\times3=1.5$	$SLT=0.5+1.5=2$
Final Exam	Hour	3	3	$CT/GL=3$	$IL=3\times3=9$	$SLT=3+9=12$

Figure 3: SLT Calculation in i-SLT for Different Component Unit

d) Credit Hour Calculation

A credit hour for a course typically represents the amount of time a student is expected to spend on teaching and learning activities over the duration of the course. In Malaysia, the 40 notional hours is used to calculate the credits hour for a course (MQA, 2017). So, i-SLT uses the following equation to calculate the credit hour for a course:

$$Credit\ Hour=\frac{SLT_{Total}}{40} \tag{2}$$

where SLT_{Total} is the total SLT for all components during the whole course duration.

With the increased implementation of work-based learning (WBL), especially for TVET programmes, it is important to properly calculate the credit hour for a course that implements WBL. In (MQA, 2016), MQA has come out with a guideline to calculate the credit hours based on the Effective Learning Time (ELT)

$$ELT=SLT_{Total}\times80\% \tag{3}$$

Then the credit hours can be calculated using the following equation

$$Credit\ Hour\ (WBL)=\frac{ELT}{40} \tag{4}$$

Users can select the type of course in i-SLT (Normal or WBL) and it can automatically calculate the proper credit hours for the course.

e) Component Monitoring

Each T&L component is labeled with some characteristics that match with their nature. For example, a face-to-face lecture is labeled as conventional / theoretical component, lab test is labeled as conventional / practical component and online tutorial using Google Meet will be labeled as Synchronous / Online Activity / Theoretical. With correct component labeling, i-SLT can display the percentage of the following:

- Practical vs Theoretical
- Conventional vs Online Learning
- Online Learning 'Synchronous vs Asynchronous Learning'
- Online Learning 'Material vs Activity vs Assessment'

f) Blended Learning Status

Blended learning, which combines traditional face-to-face instruction with online learning activities, has gained significant attention from the MOE in recent years. This is because it can enhance the quality, accessibility, and effectiveness of higher education in response to the demands of contemporary society. In (MOE, 2020), MOE has presented the criteria for any course to achieve Pembelajaran Teradun Sokongan (PTS) and/or Pembelajaran Teradun Gantian (PTG) status. For PTS, the course instructor must provide at least one (1) course information, at least seven (7) teaching materials, conduct at least three (3) online learning activities and conduct at least two (2) online learning assessments. To achieve PTG status, 30% to 80% of the SLT for the course must be conducted using online learning. Out of the SLT for the online learning component, around 40% must fall under the material category, 40% under the activity and 20% under assessment.

i-SLT fully supports the implementation of blended learning as it provides the PTS and PTG status monitoring. PTS and PTG indicators turn from red to green when all the criteria are met as shown from Figure 4. By having this feature, course instructors can properly plan their teaching and learning components to achieve PTS or PTG status.

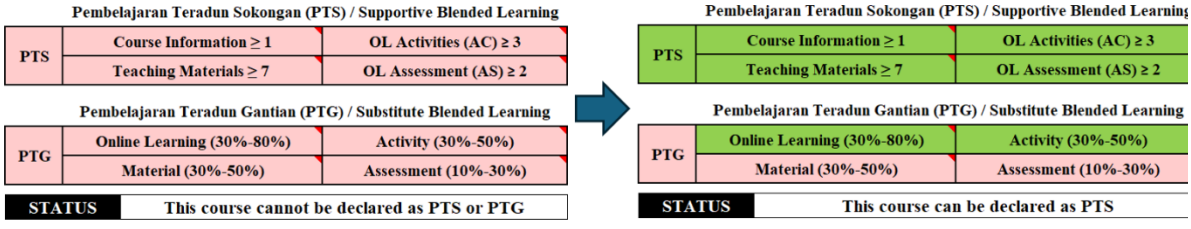

Figure 4: Blended Learning Status Monitoring

g) Compact Reporting

By default, there are many preset T&L components available in i-SLT to cover a wide range on T&L activities that might be implemented by users. However, in many cases, not all components will be used. In i-SLT, with a click of a button, users can simplify the SLT calculation reporting to produce a compact view in which only components that have been used will be displayed and other unused components will be hidden.

Effectiveness of I-Slt

To measure the effectiveness of all the i-SLT's features, a survey was conducted among UniMAP lecturers. 60 lecturers participated in the survey. The survey consisted of 13 items related to the i-SLT and for each item the participants will be given a rating from 1 (lowest) and 5 (Highest). The ratings of 1, 2, 3, 4 and 5 will be counted as a score of 0%, 25%, 50%, 75% and 100% respectively. Based on the rating given by all participants, the average score for each item can be determined. Figure 5 results of the survey including the items being asked, percentage of vote for each rating and the average score for each item. Overall, all the items managed to score more than 85%. Most of them are satisfied with the user interface, performance, ease of use and other capabilities of the i-SLT.

Conclusion

i-SLT is the solution to calculate the SLT accurately and comprehensively for a course. By having user friendly interface with lots of customization, i-SLT can be used by many people, from new lecturers to established professors. With the proper use of the component units and multiplier, users can accurately calculate the SLT for normal courses and WBL based courses. i-SLT fully supports the implementation of blended learning as it can show the PTS and PTG achievement status. The effectiveness of the i-SLT has been verified by the survey conducted among 60 UniMAP lecturers with an average score of more than 85% for each item.

No. of Participant : 60		Rating					
		5	4	3	2	1	
No	Items	Percentage of vote (%)					Average Score (%)
1	User interface	56.7	43.3	0.0	0.0	0.0	89.2
2	Performance	63.3	36.7	0.0	0.0	0.0	90.8
3	Ease of use	55.0	45.0	0.0	0.0	0.0	88.8
4	Accuracy of SLT calculation	46.7	51.7	1.7	0.0	0.0	86.3
5	Flexibility to add weeks and components	50.0	48.3	1.7	0.0	0.0	87.1
6	T&L component classification	48.3	50.0	1.7	0.0	0.0	86.7
7	SLT percentage monitoring capability	45.0	53.3	1.7	0.0	0.0	85.8
8	Blended learning status monitoring capability	61.7	38.3	0.0	0.0	0.0	90.4
9	Display in detail and compact view capability	51.7	45.0	3.3	0.0	0.0	87.1
10	Comparison with previous SLT calculator	76.3	23.7	0.0	0.0	0.0	92.5
11	Helpful instruction	53.3	43.3	3.3	0.0	0.0	87.5
12	Helpful tutorial video	67.8	32.2	0.0	0.0	0.0	90.4
13	Will recommend to others	88.3	11.7	0.0	0.0	0.0	97.1

Figure 5: Results of the Survey

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References

Gromada, A., & Shewbridge, C. (2016). Student Learning Time. *OECD Education Working Papers*. doi:https://doi.org/10.1787/5jm409kqqkjh-en

Liu, J., & Huang, P. (2021). Evaluation and Analysis of Student Academic Burden: A Global Perspective. *Science Insights Education Frontiers, 10*, 1423-1437. doi:https://doi.org/10.15354/sief.21.or062

MOE. (2018). *Garis Panduan Pembangunan Program Akademik Universiti Awam*. Jabatan Pendidikan Tinggi

MOE. (2020). *Garis Panduan Pelaksanaan Pembelajaran Teradun Gantian (Pembelajaran Dalam Talian)*. Jabatan Pendidkan Tinggi

Mohamed, Z. (2006). *Managing Student Learning Time for Effective Learning*. Paper presented at the National Conference on Technical Education 2006.

MQA. (2016). *Guidelines To Good Practices: Workbased Learning*. MALAYSIAN QUALIFICATIONS AGENCY

MQA. (2017). *Malaysian Qualifications Framework 2nd Edition*. Malaysian Qualifications Agency

Pardeshi, S., Gawade, S., & Hemant, P. (2022). Student learning time analysis during COVID-19 using linear programming - Simplex method. *Social Sciences & Humanities Open, 5*(1), 100266. doi:https://doi.org/10.1016/j.ssaho.2022.100266