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# Experiences of Teaching Engineering Students in Taiwan from a Western Perspective*

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*Recently, there has been a growing interest in educational collaboration between the East and the West. More Western educators are traveling to the East to provide local students with an 'internationalization-at-home' experience. However, the literature on teaching Chinese engineering students from a Western perspective is sparse. Impressions, opinions and myths about how Asian students respond to western teaching styles are plentiful, and are often based on outdated facts or on observation of Asian students enrolled in Western universities. Chinese societies have changed drastically in recent decades. This paper addresses recent experiences of a Western teacher giving a course to Taiwanese engineering students. Advice is given on breaking the ice, gaining contact with students, activating students, overcoming obvious language barriers, and surviving a completely different education model. It is our hope that our experiences may help other Western teachers adapt more rapidly to a Chinese education environment and maximize the impact of their efforts.*

**Keywords:** Chinese learner; teacher mobility; internationalization; cultural understanding

## INTRODUCTION

DURING the Chinese spring semester of 2005, running from the end of the Chinese lunar new year (mid-February) to July, the first author was a visiting professor at Tatung University in Taipei, Taiwan, during his sabbatical [1, 2]. Tatung University is a private university, affiliated with an established domestic technology enterprise, the Tatung Company. Tatung University educates engineers for the Taiwanese consumer electronics industry. It is a small university with about 4500 students and 200 faculty members. Tatung is located in the central historical part of Taipei—along the well known ChungShan North road that divides Taipei into east and west. As with all the 168 universities in Taiwan, lessons at Tatung University are taught in Mandarin Chinese.

The second author, who at the time served as the dean of general affairs, invited the first author to give a technical course in English for the students in the Computer Science and Engineering department. Some students continue their education in other countries, such as the USA or the UK. Moreover, Taiwanese engineers often interact with foreigners in the global business arena. The objective was, therefore, in addition to teaching technical content, to help develop the students' English language competence and understanding of foreign culture. This experiment also provided the first author with a unique insight into the lives of the Taiwanese engineering students. Furthermore, it allowed us to learn how a foreign teacher and local students respond to one another. This pioneering experiment is the first recorded account of a Norwegian scholar teaching long-term (one semester) at a Taiwanese university.

The third author's speciality is the English language competence of Taiwanese students. She has throughout the experiment been a catalyst in the process and continuously provided advice on how to narrow the cultural gaps between the foreign teacher and the local students.

## OBJECTIVES

The objective of this paper is to convey our experiences of a Westerner teaching an engineering course to Taiwanese students in Taiwan. It is our

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hope and intention that the information, observations and conclusions drawn in this paper are useful to other Western scholars who intend to teach engineering students in Taiwan, or China. Both of these regions are putting an emphasis on internationalisation. It is likely that more Westerners will be invited to give English-language engineering courses in the coming years. Furthermore, society in Chinese countries, such as Taiwan and China, are rapidly changing with noticeable Western influences. Several past accounts of teaching experiences in Taiwan and China are out of date and give an inaccurate picture [3]. This report attempts to give an honest account of the current situation in northern Taiwan from a Western perspective. Furthermore, some of the aspects described herein may also be applicable to Western universities with Oriental student enrolment. Oriental students in the West may have similar attitudes and expectations to learning and similar behaviour as their counterparts in the East. An insight into the cultural background of these students can help us make adjustments to the pedagogical approach to improve the learning outcomes.

## THE TEACHER

The teacher, in his mid 30's, is a Norwegian national. He has studied and worked in the UK for 10 years and therefore speaks English with a British accent. The teacher had some prior insight into Taiwanese culture and some knowledge of Chinese language—at a beginner's level (a vocabulary of about 1000 words and the ability to recognise about 500 Chinese characters). The teacher could participate in simple dialogue and conduct simple transactions using Mandarin Chinese, but no more than that. Therefore, all student–teacher communication had to be conducted in English. The teacher had, at the time, 5 years of university-level teaching experience from his home country, including teaching and supervising multicultural students [4].

## THE STUDENTS

There were 29 Taiwanese students in the class, all were in their mid-to-late 20s. Taiwanese students can be classified as Confucian Heritage Culture (CHC) students—a term used to describe students from Taiwan, Hong Kong, China, Vietnam, etc. About half of the students were senior students, and the others were master students. No documentation of their English abilities was available, and no language prerequisites were imposed on the students. It is the first author's impression that the level of English varied greatly. Two of the students had very good English—both spoken and written. One student had lived in the USA for a few years. Other students were unable to communicate fluently. In Taiwan, American English is most common, so students with good language competence usually have American accents. Most students are trained in US spelling and US vocabulary.

## THE COURSE

The students were taught the course 'Java Web-application development', where students learn to make distributed Web-applications using Java J2EE technology. The J2EE technology includes servlets, Java Server Pages (JSP), Java Server Faces (JSF), JDBC (databases) and i18n (internationalisation). The syllabus of the course is described in [5]. An English-language textbook [6] was used. Engineering syllabi, including the course in question, are globally relevant and it is therefore possible 'to take a course across' to different countries. In addition, the i18n aspect of the course involves the implementation of international Web-applications, and the cultural affiliation of the students and the teacher are naturally intertwined in the teaching. Offering a topic that the teacher is familiar with allows the teacher to focus on pedagogy.

## SYLLABUS

It is easy to take for granted the hidden knowledge one has in one's own institution. This is even more of an issue in a Chinese university, where most of the documentation is written in Chinese. An important tool for planning a course is a description of the curricula. Which modules have the students completed? What is covered in the various modules? What do the students know? The first author found it difficult to piece together a detailed picture of this just from speaking to the faculty members, and hence decided to design the course as a 'stand-alone' module. The only prerequisites imposed on the students were basic programming skills and knowledge of HTML-mark-up.

Students' expectations need to be considered when planning a course. It was expected that the students would select the course as they wished to both learn how to develop Java Web-applications and also to improve their English. These expectations were confirmed later when the students were interviewed on this issue. The following philosophy was adopted: 'It is better that the material covered overlaps slightly with existing courses and the students' prior knowledge, than providing material that is all totally new to the students'.

## SELECTING A TEXTBOOK

Selecting a textbook was not easy. A textbook should cover most of the syllabus, and the material should be covered in an understandable,

pedagogical and correct manner. However, in Taiwan two more requirements emerged: availability and price. Textbooks that are easily available in the West can be hard to find in sufficient quantities in Taiwanese bookshops. Although English-language textbooks are commonly used by local teachers, Chinese-language textbooks, or translations, are more common. Furthermore, locally printed books are less expensive than foreign imported books (the average price of a locally printed textbook is approximately 10 US$). Unfortunately, there are few locally printed English language textbooks. It was therefore necessary to select an imported foreign book with an acceptable price.

## WARNINGS FROM STUDENTS

Prior to arriving at Tatung University, the first author visited National Cheng Kung University in the south of Taiwan. During this stay he attended a large number of seminars for PhD and master students and had the opportunity to talk with many postgraduate students. Upon hearing that the first author was going to teach at Tatung University a few postgraduate students expressed their doubts. They advised the teacher to provide a large amount of coursework in order to push the students. Furthermore, the teacher was advised to use entertaining PowerPoint slides to keep the students awake in class. In addition, they held the view that students in private universities are academically weaker than those in national universities. This view was reiterated by other scholars from various universities around Taiwan. However, the impression of the first author is that these differences are much exaggerated. The Chinese value memorization and exam-sitting skills, which are essential for entering into high-ranking national universities. However, problem-solving and creative skills, valued by Westerners, can be found across the full spectrum of universities in Taiwan. In fact, the first author perceived a stronger motivation, focus and diligence among the students in the private university, than among the students in the national university. Rank, status and face value are still important in Taiwanese society.

## MYTHS

There is a Chinese saying that is very useful for a Westerner to remember when approaching a Chinese environment, namely 'There are no absolutes in China' [7]. Westerners who are faced with the 'mysterious and unknown' Oriental culture have a great desire to understand and put observations into system, and unfortunately often also make false generalisations in the process. One should therefore be cautious of what other Westerners say, unless they have solid experience. The Chinese and their culture are diverse, although it might not seem so to the new visitor from the West. Conclusions drawn from observations in one place or situation may not hold in another place or situation. Common myths and their impact on the teaching of Chinese students have been described in the literature [8–10]. Some of these are addressed in this paper.

## CULTURAL DIFFERENCES

Many myths are based on experiences with Chinese students studying at foreign universities. Differences in culture manifest themselves when teachers interact with Chinese students and their parents [11, 12]. For example, a study by Ran [13] shows that Western (British) teachers focus on macro aspects of education and consider error an integral part of the learning process. Excuses and leniency are used as encouragement and the 'process' is centre stage. Chinese parents, on the other hand, focus on micro aspects of education where the goal is to improve accuracy and obtain perfect test scores. Criticism is used to achieve improvement. 'Anyone' can be educated according to Confucian traditions [14].

From an engineering perspective, the Chinese have a reputation for being very good at mathematics and generally very intelligent. A few interesting studies have looked at these phenomena. For instance, it has been found that the average Chinese student scores 5 IQ points more than the average Western student [15]. This has been explained by the fact that Chinese students learn to read and write Chinese characters. This process trains students' memory skills (a knowledge of about 3000 Chinese characters is needed to read a regular newspaper). Several studies have also explored the mathematical abilities of Chinese students [16–18]. These studies have found that Chinese students are superior to Western students in terms of mechanical mathematical operations, such as addition, multiplication and division, but not in problem-solving tasks [16]. This difference has been attributed to the simplicity of the Chinese number system. Just 16 characters, or words, are needed to represent most numbers and students learn multiplication rules as rhymes in a system that, with practice, allows mental multiplication and division to be carried out very quickly. A good explanation of primary school Chinese mathematics education can be found in Zhang and Zhou [18].

## THE CHINESE CLASSROOM

Much has been written comparing the Chinese classroom (see Fig. 1) with the Western one [9, 14, 19–28]. Western teachers often view oriental students as passive and plagiary, while Oriental students often view Western teachers as unprepared,

Fig. 1. The Chinese classroom—passive copycats or just a different learning philosophy?

Fig. 2. The Chinese teacher—an expert in the field and moral role model. Students gradually learn the skills of the master by academically imitating him.


Fig 3. The Western teacher—a pedagogically trained educator with modern teaching skills or an incompetent, unprepared, ignorant fool? Students discover the knowledge for themselves under guided supervision.

lacking in authority, and not knowledgeable in their field. A 'good' Western teacher is one who is dynamic and stimulates discussion and interactivity, while a 'good' Chinese teacher is an expert in the field, who knows and provides all the answers and is a moral role model (see Fig. 2). Western exploratory teaching, i.e., learning by trial and error, seems haphazard and unprofessional from a stereotypical Chinese viewpoint (see Fig. 3). The Chinese are taught to learn by copying their masters in order to reach perfection. The students are to learn to become like the teacher, who has to be an authoritative role model. Obviously, the concept of 'imitating the master' is not compatible with Western teaching ideology where plagiarism is one of the worst academic offences.

The first author found this established Western view of the Oriental classroom to be only partially true. Again, there was a noticeable diversity. A few of the students fitted the classic description perfectly, while others did not. Several of the students asked questions and corrected the teacher, and one student even challenged the teacher on various topics. It seemed that the interactivity of the students was more strongly related to the students' language ability and personality (outgoingness) than anything else. Students who are not confident in English may be too embarrassed to speak up in public [29, 30]. Another reason could be that the students perceived the teacher as a Westerner—i.e., not a Chinese teacher, much like the Westerners they see in Hollywood movies. It could therefore be easier for the students to enact the role of 'Westerners' in front of the Western teacher. It might be hard to do the same in front of a Chinese teacher.

Next, students were very conscious of having the chance to practise English. This was probably a strong motivation to speak up, or talk to the teacher after class. The teacher was effectively an interactive language-practising tool. Moreover, the teacher encouraged interaction and interruptions in class. Some students might have experienced an inner conflict whereby, on the one hand they should listen to the 'valuable words' of the teacher, while on the other hand they should use the rare opportunity to practise and improve their spoken English.

Finally, Western influence is probably also a factor. The students in present-day Taiwan are exposed to, and know about, Western culture to a greater degree than students of, say, ten years ago.

The teacher did not feel a strong sense of authority. Instead, he was more of a friend to the students. However, the Confucian relations hierarchy [14] is so deeply rooted in Chinese culture that there will always be some hierarchical separation between teachers and students.

Although the students were more interactive than was expected, they were more passive than Western students. Several techniques were employed to involve the students. First, general questions were asked addressed to no one in particular, such as 'Does anybody know why/what . . . ?'. When nobody volunteered to answer, or when only the same few students answered, specific students were addressed directly by name. This strategy appeared unproblematic, as the student would willingly provide the answer, although he or she might need extra time, and sometimes help from their fellow students, to express themselves in English. While Western students often dislike volunteering to answer questions from teachers, Chinese students try to do as the teacher requires.

The moral role-model responsibility of the teacher also manifests itself in the teachers' attire. When teaching in a Chinese environment it is advisable to dress appropriately. Many teachers in modern-day Taiwan still wear a shirt and tie. The dressed-down laid-back style of Western teachers may be counterproductive in maintaining


Fig. 4. Enacting the curriculum as a play—Chinese-style plenary discussions.

the stereotypical image of the authoritarian teacher. Formal attire helps to maintain the expected divide between the teachers and their students.

## PLENARY DISCUSSIONS—CHINESE STYLE

It is difficult to involve Chinese students in Western-style plenary discussion. However, a variety of Chinese-style plenary discussions were attempted ('Talking to know versus talking of the known') [26]. This is similar to the Western notion of acting out a play. Two students were called to the front of the class and placed each side of the projector screen, together with the teacher. The teacher had prepared the lines in advance for each of the students using Microsoft PowerPoint (see Fig. 4). Next, the students enacted the play as it was presented, step-by-step, on the projected screen. Speech bubbles were used for the dialogue and instructions were signalled using regular text. Students willingly participated when called, much to the enjoyment of the other students.

Of course, one cannot solely depend on planned role-play for all the lectures, but it provides extra surprise and variation that can spice up an otherwise monotonous lecture.

The teacher reported 'interactivity-fatigue' half way through the semester, as it is exhausting constantly to initiate interactivity. Such fatigue is less intense when teaching Western students as they more naturally involve themselves on their own initiatives. It is therefore useful to know that it is acceptable occasionally to switch to Chinese-style teaching, i.e., one-way information delivery, for the sake of self-preservation.

The personality of the teacher probably affects the atmosphere in the classroom as it helps if one is lively and outgoing. For instance, a study by Ting [31] showed that Chinese students are capable of differentiating between good and poor teaching and teachers. Ting found that the teacher's personality plays a stronger part in Chinese students' perception of teaching quality than it does for Western students. The role of the personality of the teacher was also studied by Chan [32], who found that renqing (translated into English as human sentiment), face (society's confidence in an individual's moral character and social perceptions of a person's prestige), harmony and leadership significantly affect a teacher's efficacy in the Chinese classroom.

## POWERPOINT PRESENTATIONS

PowerPoint was used for most lectures. PowerPoint is widely used by the local teachers and the students expect it. Most classrooms are equipped with the necessary audio-visual equipment.

Before the course started the teacher had been advised by several students to make 'fun' PowerPoint presentations, to stop students falling asleep. In the classrooms of local teachers one will see an established culture of creative and entertaining PowerPoint use.

PowerPoint presentations allow students to corroborate what is orally being said in class. This is particularly useful to the students whose English comprehension is not fully developed. It was noticed that there was a noticeable disparity between the reading abilities and listening abilities of the students, and this observation is consistent with the literature [33].

It is a commonly held view among Western teachers that PowerPoint presentations make classes more passive and therefore should be used sparingly and with care. So what about a class of already passive Chinese students? The use of PowerPoint presentations is consistent with Oriental didactics as such presentations can be authored to contain well-defined, correct and authoritative content, i.e., 'the knowledge'. Although PowerPoint presentations have the undesired side effect of making classes passive, they help justify the competence of the teacher and help establish students' trust. In other words, the benefits of student motivation, trust and reduced language barriers outweigh the drawbacks such as student passivity. On the other hand, our experiences confirm that carefully prepared PowerPoint presentations facilitate activation of the students when used in conjunction with prepared role-play. In summary, PowerPoint presentations can be a well-justified lifesaver for a Western teacher stepping into an Oriental classroom.

## LANGUAGE ISSUES

Language is a major issue when teaching a technical subject to a class of Chinese ESL-students [33–37]. Initially, the students were curious about the teacher's (British-influenced) accent as it did not sound American. There was probably some initial disappointment among the students, since the new foreign teacher did not sound as they expected, and not as they had heard in the movies. However, the students seemed quite happy after being given a brief introduction to the different forms of English and how the American accent evolved. Furthermore, it did not take long for them to become comfortable with the accent. British–American word discrepancies are not common, but were resolved as they emerged.

To assist students' listening comprehension there are several obvious pieces of advice to keep in mind. A study by Huang [33] demonstrates the importance of the teachers' articulation. He gives the following advice. First, it is important to speak slowly, and to maintain a slow pace. Second, words should be articulated clearly and loudly. Most lecture theatres are equipped with microphones and speaker systems, and such equipment

is widely used by the local teachers. However, when asked, the majority of the students discouraged microphone usage. The classroom was not too large and the teacher's voice carried all the way to the back. Third, one should be careful of using slang or colloquial expressions. However, it is our opinion that some slang and colloquialisms are educational as long as they are clearly indicated, explained and discussed [38]. Language competence includes knowledge of slang as well as formal English. Next, long and complex sentences should be split into shorter, more manageable, sentences. Discourse markers can be effectively used to improve comprehension. Finally, gestures can be used to convey meta-information and further assist the listening comprehension of the students. Gestures were also actively used to synchronise the spoken presentation with the content on the PowerPoint presentations.

During a semester the students naturally adapt to the teacher's style of speaking. The teacher could therefore gradually increase the speaking speed and the complexity of the spoken sentences.

## COURSEWORK

Westerners appreciate the Chinese proverb 'I hear I forget, I see and I remember, I do and I understand' as much as the Chinese. Coursework is obviously an important part of any engineering course and a challenge to educators in both the East and the West. How does one ensure that the students are exposed to the curriculum? How do we ensure that they learn the necessary skills? How do we ensure that the students work and make progress? How do we minimise the risk of a free ride and plagiarism? For this particular course it was appropriate to assign four mandatory projects spread throughout the semester. The completion of these projects contributed towards the final grade. The students had to conduct the projects independently to minimise the risk of a free ride, although they were encouraged to discuss solutions together. No other mechanisms were introduced to stop students' from copying each other.

Each project comprised programming a small application using the technology covered in the lectures. The first project involved implementing a simple chat-system using Servlets; the second project involved implementing a simple blog (Web log) using a Servlet connected to a database; the third project comprised making a simple multilingual Website using a standard i18n tag-library (in English, Chinese and Japanese) and the final project involved implementing a custom-tag library for solving quadratic equations.

Several interesting observations were made. Only a few students kept to the deadlines. A penalty scheme, where students lost 1% for every 12 hour late failed to deter late submissions. Initially, it was expected that this was due to the difficulty of the assignment. However, only a handful of students attended extra tutorial sessions. It seems that the most plausible explanation was their heavy workload. The course was an additional module and not part of the core curriculum. Thus, they gave it low priority.

Registration and book-keeping of students' names also proved to be a challenge. Some students provided all the requested information, which included their Chinese name written in Chinese characters, their Chinese name written in Hanyu Pinyin (alphabetic phonetic transcription), their English name (if any), student number and e-mail address. Other students provided only partial information. Usually, a Chinese name is written in the sequence of surname (one character) followed by the given name (one, or usually two, characters). However, some students decided to 'help' the foreign teacher by swapping these around, resulting in confusion and inconsistency. The difficulty of collecting lists of students was also reported in Bailey and Herman [3] where the teacher, through a misunderstanding, received a list of all the students in the entire university, when he only asked for a class list.

The content of the coursework submissions adhered to expectations. Some students managed to solve the problem adequately, and others managed to submit only partial solutions. Students also seem to have similar problems, and fall into the same traps, as Western students. However, there was one noticeable difference between the coursework submitted by the Taiwanese students and similar coursework submitted by Norwegian students. The Taiwanese students produce more simplistic and stripped versions than the Norwegian students, who usually put forward elaborate solutions. The Norwegian students place more emphasis on aesthetic design and extra unspecified, nice-to-have, functionality, while the Taiwanese students' solutions simply adhere to the specifications. One explanation for this could be that the Taiwanese students are under more pressure and have less time on their hands than the Norwegian students. They are therefore forced to go straight to the heart of the problem, while Norwegian students have more time to explore and experiment. Could this be an effect of the education system? Could it be that the Taiwanese students want only to satisfy the specification as it is disrespectful to deviate greatly from this? Interviews with Norwegian students reveal that they go a long way to extend their solutions, not only to improve their grades, but because they are inspired, are curious, and enjoy it. The specification is just a starting point. The purpose of the teacher is to assist and monitor that the requirements are satisfied. Are Taiwanese students more pragmatic than Norwegian students? Are Norwegian students more idealistic than the Taiwanese students? Or is it just an effect of other factors, such as foreign versus native language instruction? Clearly, there is not enough evidence to draw a

conclusion here, but this is indeed an interesting topic for further study.

## ASSESSMENT

The students were assessed through a final examination. In Norway, it is common to have long exams lasting up to 6 hours, while the Taiwanese settle for short 100-minute exams. The organisation and execution of the actual exam was, surprisingly, less bureaucratic than in Norway. Teachers select the location for the examination, are responsible for printing the exam paper, distributing it in the examination room, monitor the exam, and collect the papers afterwards. In contrast, in Norway the teacher will produce the exam paper and a sample solution and then hand these to the administrators who will handle the rest.

The teacher decided not to make the test too hard because of the language deficiencies of the students. It turned out that all the students finished the exam paper before the allotted time and that the teacher had underestimated the written exam-sitting skills of the students. In hindsight, the exam should be more comprehensive. One must not be fooled by the spoken competence of the students, as their ability to express themselves in writing is usually better than their oral proficiency [12].

Assessing the manuscript is an interesting exercise. Each country has its own grading system, but the Taiwanese, and Chinese, grading systems are in a category of their own. Undergraduate pass grades are in the range of 60% to 100%, i.e., a grade below 60% is a fail. For master students the pass grades are in the range 70% to 100%. Norway has recently adopted letter grades from A to F, where F is a fail, and represents a score below 35%. Clearly, it does not make sense to compare directly percentages from the Western scale to the Taiwanese scale. The approach taken was to first grade the manuscript according to the Norwegian standards, then apply a linear conversion to the Taiwanese range. Furthermore, the humane face of the Chinese education system revealed itself at this point as 'adjustments' were conducted afterwards to fine-tune the grades; here other factors were taken into consideration. This practice is unacceptable in Norway and would generally be frowned upon. In Norway one strictly follows the measured examination performance.

## CONCLUSIONS

This paper has presented the experiences of teaching local students in Taiwan from a Western perspective. Few engineering students in Taiwan get the chance to be taught by a foreigner, and several students chose to follow the course solely because of the prospects of practising English. To these students the actual course content was of secondary importance. It is acceptable for such a course to overlap with existing courses. However, prerequisites should be kept to a minimum and it is better to keep things simple and easy rather than complex. A series of small assignments distributed throughout the semester is more likely to stimulate students to work on the subject than one large project. Moreover, students expect the semester to end with a written exam. Students' exam-sitting skills are not to be underestimated, nor are the students' writing and reading skills. However, their spoken communication skills should not be overestimated—especially in the context of lectures. Students are generally passive by default but can be activated through planned role-play. PowerPoint is a useful tool in the Chinese classroom. It helps students with a weak comprehension of spoken English follow the lectures more easily. Students expect teachers to use PowerPoint and a PowerPoint presentation serves as a platform for delivering the 'correct and accurate knowledge', helps the teacher gain the students' trust and confidence and can be used to activate the students in planned role-play. Teachers are moral role models and should dress and behave accordingly. One should enter the Chinese classroom with an open mind as there are 'no absolutes in China' (or Taiwan). Chinese students and the way they behave are as diverse as Western students. Our observations indicate that the modern Taiwanese student typically has one leg firmly planted in Chinese culture and the big toe of the other leg dipped into Western culture. Our recommendation is that Western teachers should be themselves and not adopt too much of the Chinese learning style. The process of adapting to the Western way of teaching, and to learning about Western culture, is also an important part of the students' overall learning experience. However, insight into Confucius relational hierarchies, Chinese pedagogy and Chinese culture and language can help the Western teachers more easily interpret signals from the students and thereby identify problems early and consequently help the students. The overall goal is to maximise the learning outcome for the students, while embracing diversity.

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