Chapter 10
Fostering Inclusivity Through Dynamic Teaching Practices

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Abstract Teaching within the context of Higher Education (HE), often involves interacting with a wide variety of students, who come from, and have varying backgrounds, not just in their capabilities, but also with regards to their understanding. As such, dynamic teaching styles and practices need to be adopted in order to allow for inclusivity. This chapter highlights a particular case study involving the author, and a module that he currently leads—IMAT3406: Fuzzy Logic and Knowledge Based Systems. The teaching style and approaches adopted allow for a better understanding of core concepts, from which better executed applications can be garnered. Making sure that *it makes sense to all*, ensures that the foundational knowledgebase needed from which to build upon is adequately in place, so that everyone in the cohort is on a level playing field. This can be achieved through dynamic teaching practices, often involving acclimation and assimilation to the cohort. Making sure that a concrete understanding exists before the students are encouraged to undertake their coursework, has proved to cater for exceptional output, not only in terms of detail, but both in quality and substance. Through tried and tested means, the case study used in this chapter sheds light on the attributes of a successful approach; describing how the author's own accession to harbouring inclusivity is adopted and executed for the module IMAT3406.

Keywords Dynamic teaching practices · Inclusivity · Assimilate · Acclimate

10.1 Introduction

Teaching with regards to Higher Education (HE) often does not involve a single track of execution. By that, personnel and staff members alike are encouraged to cater for the addition of students whom may not satisfy the general norm of an *expected* student. There may be students whom are on the spectrum; students with

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physical disabilities; students with underlying mental disabilities; students whom are not aware of issues they may currently be experiencing, and so on. Within these categories, there are many sub-categories, which splinter off into specific nuances and niches. Regardless of what issues are presented the learning objectives of the module must be attainable by all. To ensure this, the teaching practices need to allow for a non-stringent adaptability, practices that are fully inclusive to all enrolled. Exclusion of a single learner due to circumstance is morally abhorrent as well as a blatant disregard to institutional and government policy. The qualities of a good practitioner of pedagogy should always have the ability to be dynamic, resourceful and patient. Regardless of the context of the module, programme, course or any other instance of classroom based learning, a dynamic approach to teaching is beneficial for all. By being adaptable allows for absolute inclusion of all in the cohort, ensuring that the delivery of teaching objectives are presented and more importantly, that it is understood.

The author of this chapter is the current module leader for IMAT3406: Fuzzy Logic and Knowledge Based Systems, a module belonging to the Faculty of Technology at De Montfort University, United Kingdom. The weighting of the module is 50% coursework and 50% end of year exam, this will become 100% coursework for the 2018/19 academic year onwards. This particular module has been chosen as a case study due to its relevance and advocacy of adapting to change. It is noteworthy to extend a mention that the author received all his degrees from the institute he now lectures for, De Montfort University, where he obtained his B.Sc., M.Sc. and Ph.D. This is a key point, being a student to transitioning to post graduate study, to then transition to academic staff member, all the while at the same HE institute, provides for a unique perspective. It is precisely this perspective that has allowed for the IMAT3406 module to flourish in recent years, with consistent praise and recognition to the teaching practices being adopted. Being more aware of the culture and coupled with the fact that the author was a student on a variation of the module, has all played a part in shaping the module as it is seen today. The changes the author would have liked to have seen been implemented as a student are the changes that he has implemented himself; practice what you preach, so to speak. This is the main reason why the module itself is so well received by so many, it is the embodiment of what the author would have liked to have received as a student himself, somewhat subjective, although effective.

It is also noteworthy to mention that the author was a recipient of a 2018 Vice Chancellor's Distinguished Teaching Award (VCDTAs). The VCDTAs were established in 2005 in order to recognise and celebrate the lecturers who have inspired and motivated their students to succeed. Not only do students nominate lecturers, they sit on the awards panel, helping to recognise the creativity and outstanding quality of De Montfort's teaching staff. This in itself validates the effectiveness of the practices that the author adopts for the delivery of the module.

The author is also the programme leader for G50052: Intelligent Systems, where the fuzzy module is compulsory for all final year (Level 6) students. The module itself is a 15-credit module and is currently undertaken during Term 1 (October–December) of the academic year. The module itself is available to several other programmes in addition to Intelligent Systems, such as; Computer Science, Software Engineering; Computer Security; Forensic Computing; Computing; Computer Games Programming; Erasmus Exchange; and Maths. Year in and year out, the module has become more popular, with current enrolment numbers reaching roughly 170 students. The enrolment figures for the 2018/19 academic year are currently at 196 students. Maths is the latest programme to allow for the module to be an option for final year students. The module is very popular with students from the Erasmus Exchange programme, which is essentially a student swap from an international institute. These students will be well versed in the English language, nonetheless, additional teaching practices are implemented to ensure an absolute understanding by all.

10.2 What Is Fuzzy Logic?

The module itself is best understood as being a mathematical means to model uncertainty. Fuzzy logic is ideally suited to modelling vague, abstract concepts such as linguistic information. To crisply define a notion like that of *'Tall'* is inherently difficult when only considering a crisp, classical understanding of membership. If one was to model the notion of *Tall* using conventional crisp means, it can be assumed that 6 foot would indeed be classified as *Tall*, and would absolutely, unequivocally belong to the set *Tall*. Fuzzy logic however, using the application of fuzzy sets, allows for one to use a degree of membership, allowing one to quantify the belongingness to a particular set. A classical crisp set approach has only 2 possible outcomes; the observed object belongs to the set, or the observed object does not belong to the set and belongs to its complement. Black and white, up and down, left and right, very clear cut, no grey areas. It's either you are or it's either you're not.

A fuzzy set allows for an observed object to have partial belongingness to a set, a degree of truth; a single object can belong to several sets to varying degrees. This is in contrast to the classical approach as we are no longer restricted to either a; yes it does belong, or a no it does not, we now have the option to how much does it have an association. The rationale of fuzzy is that it allows for one to better model humanistic nature so that better computational models can be created, a more accurate model leads to better inference and better decision making based on said inference. The more detail one can capture foundationally, the more accurate the output will ultimately be.

Classical set theory makes use of Boolean logic (Boole 1847, 1854), whereby an object is classified as absolutely belonging, or absolutely not belonging to a particular set (Cantor 1895). The use of crisp boundaries applies an inherent level of strictness to what the set can model, instances where only two outcomes are allowed, such as an integer being either odd or even; such instances are easily handled using this classical approach. However, there is a need to encapsulate uncertainty that is associated to vagueness when considering human based perception. Human nature and inferencing does not work in such a precise and crisp manner, a humanistic approach needs to cater for the existence of imprecision based uncertainty, along with vagueness. The understanding of a set from a classical perspective is not a fitting synthesis for human intuition. The notion of *mereology* described by (Lesniewski 1929), considered the idea of an object being partially included in a set, this was the basis for the formulation of Max Black's vague set (Black 1937), created in the 1930s.

The building blocks of any fuzzy implementation involves the use of fuzzy sets, first proposed by (Zadeh 1965). A fuzzy set can be seen as an extension of the ideology of a vague set. From its inception fuzzy logic has been further expanded upon to establish itself as a powerful and successful paradigm for modelling uncertainty (Zadeh 1973). As logic is associated to propositions, fuzzy logic can be seen as the calculus of fuzzy propositions. Mathematical applications for precise reasoning will often need crisp understandings, however, this becomes problematic when concepts such as natural language are involved. Linguistic vernacular can be inherently vague, with a prevalent amount of ambiguity. Our daily existence will often be littered with varying degrees of uncertainty, further invoking various aspects of specific uncertainties (Zadeh 1999).

The use of a classical set for the modelling of unclassical behaviour will often fall foul when considering the vagueness of uncertainty. For example, the abstract concept of *Tall* cannot be universally defined, a single crisp value cannot be put forward as an indicative representation that is agreed upon by all. What is *Tall* to some may not be as *Tall* to others. Figure 10.1 provides a visualisation of what a typical crisp bounded set may look like. The plot in the figure describes any person being $6'$ or taller as a validated member of the set *Tall*. However, using this precise and strict definition, it would neglect any instance of anything less than $6'$. It can be generally assumed that $6'$ is indeed *Tall*, but so too is $5'\ 11''$, at least to some extent. The only association one can attribute to a value is if it is included in the set *Tall* or not. The problem now becomes one of determining the bounding of the set, to realistically encapsulate all common held assumptions of what satisfies the notion of being *Tall*. This echoes the sentiment of Sorites paradox, arising from a vague predicate. A single grain of sand does not constitute a heap, nor does two grains of sand. However, when we have a billion grains of sand, we then certainly do have a heap of sand, at what point do we transition from not being a heap, to becoming a heap? A fuzzy perspective will allow for a more forgiving approach, one that enables an object to have partial belongingness.

The most fundamental aspect of fuzzy set theory is its understanding of numbers. A fuzzy number is ideal for describing linguistic phenomena, where an exact description of its state is unknown. Fuzzy numbers were first introduced by (Zadeh 1975), for the purpose of approximating real numbers which deal with uncertainty and imprecision associated to quantities. It has great scope when approximating *height*, or *weight* and other such uncertain abstractions. The apex of a fuzzy number will generally be the only point where an object can be given a maximum degree of inclusion equal to 1. The varying degrees of membership for other objects will be indicative to their proximity to the apex. Fuzzy sets extend the notion of fuzzy numbers to allow for more versatility.

If one was to describe the set *Tall* as seen in Fig. 10.1, using a fuzzy approach, a possible visualisation may look like the plot contained in Fig. 10.2. In this plot, the inclusion of other possible values that could be deemed as *Tall*, values such as 5′11″ would also be included, but to a lesser degree when compared to that of 6′. Following this understanding, 5′10″ would also be a viable candidate for inclusion, but to a lesser degree than 5′11″, and so on. Using a fuzzy perspective for encapsulation, one is able to relax the expected strictness one would associate with a crisp set. Not only does a fuzzy set allow for a more harmonic understanding of uncertainty, but it is also able to fall back to a classical interpretation if need be. The degree of belongingness may be that of absolution, or absolutely not, in which case, a fuzzy set can replicate a crisp set (Klir and Folger 1998). In essence, the process of mapping a membership value to an object is known as *fuzzification*. It is only when considering that an object may have partial belongingness, does the strength and applicability of a fuzzy set become apparent.

A fuzzy set on its own can only allow for a certain amount of functionality, the combination of multiple fuzzy sets allows one to extensively model an abstract concept, that would otherwise be very difficult to represent using a crisp understanding. As it is a set of ordered pairs, the object (x) is associated to a degree of inclusion $\mu_A(x)$, the same (x) may belong to more than one set, and as such may be attributed to multiple degrees of inclusion. A fuzzy set goes against the traditional approach of classical set theory, by allowing an object to belong to different sets by varying degrees of membership. Such is the methodology of fuzzy sets, the law of the excluded middle and the law of contradiction are ignored. These two prevalent laws would stop an object from belonging to more than one set if a crisp perspective was used. Continuing with the notion of *Tall*, Fig. 10.3 demonstrates how using an additional fuzzy set, one can allow for a more humanistic approach in understanding the significance of any given value. This plot contains an additional set labelled *Short*.

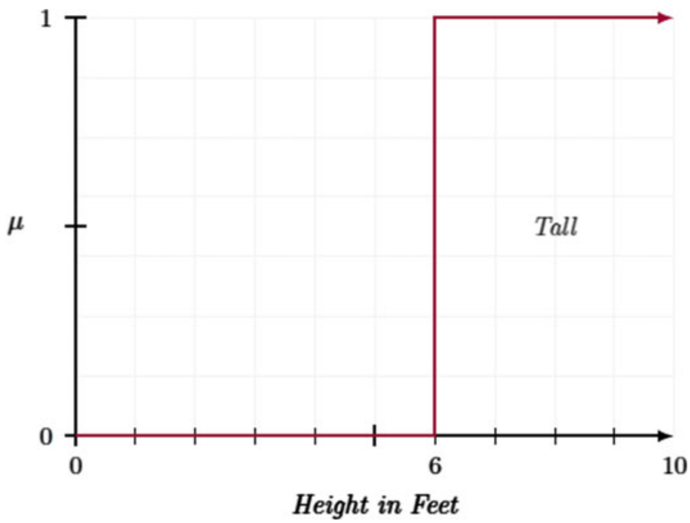

Fig. 10.1 An example of a crisp set

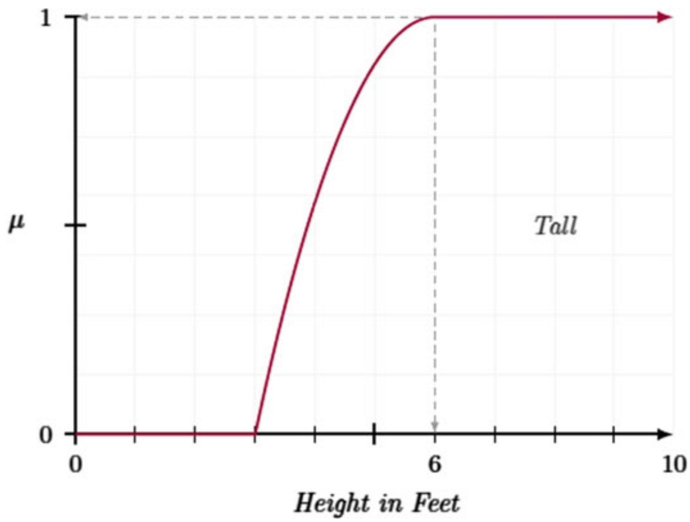

Fig. 10.2 An example of a single fuzzy set

The value 6' in this instance can be seen to have an absolute degree of association to the set *Tall* with a returned degree of membership of 1, and a partial degree of inclusion to the set *Short* with a returned degree of membership of 0.14. If one inspects the object value 7′, it can be seen to have absolute inclusion to the set *Tall*, and complete non-inclusion to the set *Short*. This logical assumption that being 7′ would never be regarded as being *Short* can be easily catered for, as too can a plethora of other abstract notions. What has been presented is the foundational underpinnings that make up the fuzzy module, without delving deeper into the mechanics, this is what the students will have to grasp in order to make gains on their coursework. There is no prerequisite for the module, as the author presents the syllabus using the assumption that no one has been introduced to fuzzy before; which is often the case.

Fuzzy logic itself is well respected in the academic and research community, with many dedicated conferences and journals. The real world applicability of fuzzy has seen it be deployed in many different and varied industries, further reinforcing the effectiveness of such an approach. Given all this, the need to have a module dedicated to fuzzy is clear to see. From fuzzy one can delve into a multitude of different hybridised concepts and off-shoots (Khuman et al. 2015, 2016a, b, c). The author is a fuzzy researcher, so therefore the students have an academic expert on the subject. This pays dividends in that it allows for core concepts to be explained in a variety of different ways, as opposed to someone just reading off the slides or from a lab sheet. The author's expert knowledge and enthusiasm for the subject were highlighted in the feedback given by students on the module, this also constituted and contributed to being awarded a 2018 VCDTA.

The aforementioned foundational aspects of fuzzy logic are extended to explain how when piecing it altogether, one can then create a fuzzy inference system (FIS).

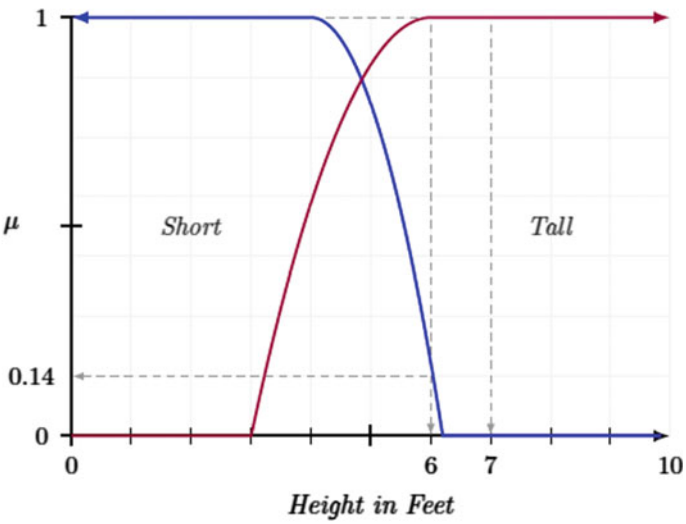

Fig. 10.3 An example of multiple fuzzy sets

The coursework component of the module involves each student creating their own FIS, in doing so, the student will appreciate the intricacies in articulating on their subjective understanding of their chosen application domain.

10.3 Teaching Practices

The configuration of the teaching timetable with regards to the module is; 1*1 h lecture each week, with 1*2 h lab session. The lab sessions utilise the use of MATLAB, which is a multi-paradigm numerical computing environment. A proprietary programming language developed by *MathWorks*. Contained within the install is the Fuzzy Logic Toolbox, which the students are allowed to experiment with to mock up prototypes (Grasha and Yangarber-Hicks 2000). The author anticipates that some of the cohort will be competent programmers and some may not, this does not affect the learning objectives. Most of the students will have no experience with MATLAB, and for those that do, they appreciate the starting from the ground up approach, and see it somewhat as a refresher course on the software. Every lab session in the first few weeks is spent becoming familiar with the software and gaining confidence with the fuzzy library, building up on previous sessions by understanding more functionality. By the end of the module every student will be able to code up in MATLAB and describe the technicalities of their coursework submission.

The capacity of each lab is 20 students, with most labs being timetabled so that there is a least 1 or 2 spaces left spare just in-case there are students attending from other lab sessions. The author leads the entire module, including all lectures and all labs. This was deliberately done so that consistency in teaching style and expertise throughout could be maintained. This commitment was very well received when it came to students providing their feedback. As the current cohort size is roughly 170 students, this results in 9 timetabled lab sessions each week, the times of which varying from first thing—0900:1100, to midday, to late afternoon—1400:1600. The lectures are always Friday—0900:1000. It is noteworthy to mention, module leaders, programme leaders and the like, generally have no say with regards to when and where their modules occur in the timetable. This is an optimisation problem beyond the module leader's control. With this being the case, this adds an additional facet that needs to be taken into consideration when delivering one's lectures (Benett 1993).

10.3.1 Teaching Practices—Lectures

Referring to Table 10.1, one can see that the lecture for the module is Monday morning first thing—0900:1000, this is to the displeasure of the majority of the students. Regardless of the module or type of lecture, students are rarely, fully engaged at that time in the morning. It is the job of the lecturer to engage as much as possible, all the while to not be too overbearing. Expecting the students to absorb everything that is presented to them is an unrealistic expectation given the time of the lecture. This highlights the importance of lecture material being made time specific in accordance to when it is to be delivered; it is advantageous to include content relative to the learning objectives, but not to overwhelm, as this can be counterintuitive. The current method of delivery is to ask the students in the lecture room, '*if they have understood a particular aspect of the lecture material*'. If so, we proceed onto the next aspect, if not, we collectively repeat, presenting the notion using a different perspective.

The learning objectives of the module are a super-set of the learning objectives of each lecture. As such, there is more flexibility in arriving and satisfying the lecture objectives, in so doing, encompassing as much collective participation as possible. Given that this is a third year module, the students are more likely to have already formed a familiarity with the cohort. This can be used as additional tool when incorporating various teaching practices and styles. The module itself, has many times, made use of the students in explaining core concepts vital to the understanding of fuzzy logic. Through a variation of peer-to-peer tutelage, the author encouraged the students who understand the concepts to explain it using their own words to the rest of the cohort. Sometimes hearing it through the words of a fellow student, allows for a more concrete understanding. This is not to imply that all aspects of the lectures are undertaken in this manner, but rather when the situation is called for, this only becomes apparent when the room is gauged. By incorporating student inspired explanations instils an obtainable quality, for the quality of the student doing the explanation can be extremely varied; from the stand-out high fliers, to the well reserved and conservative. Seeing and hearing a fellow student explain can positively affect the learning curve of the room. It should be expected that a student will always

Table 10.1 Module timetable

Tuesday								
Day	Start	End	Weeks	Activity	Type	Module title	Room	Staff
Tue	9:00	10:00	1–5, 7–11	IMAT3406/Y L/01	Lecture	Fuzzy Logic and Knowledge Based Systems	BI0.05	Khuman A
Tue	11:00	13:00	1–5, 7–11	IMAT3406/Y P/01	Practical	Fuzzy Logic and Knowledge Based Systems	GH5.82 Lab	Khuman A
Tue	14:00	16:00	1–5, 7–11	IMAT3406/Y P/02	Practical	Fuzzy Logic and Knowledge Based Systems	GH2.83 Lab	Khuman A
Wednesday								
Day	Start	End	Weeks	Activity	Type	Module title	Room	Staff
Wed	9:00	11:00	1–5, 7–11	IMAT3406/Y P/09	Practical	Fuzzy Logic and Knowledge Based Systems	GH2.81 Lab	Khuman A
Thursday								
Day	Start	End	Weeks	Activity	Type	Module title	Room	Staff
Thu	9:00	11:00	1–5, 7–11	IMAT3406/Y P/03	Practical	Fuzzy Logic and Knowledge Based Systems	GH5.82 Lab	Khuman A
Thu	11:00	13:00	1–5, 7–11	IMAT3406/Y P/04	Practical	Fuzzy Logic and Knowledge Based Systems	GH2.83 Lab	Khuman A
Thu	14:00	16:00	1–5, 7–11	IMAT3406/Y P/05	Practical	Fuzzy Logic and Knowledge Based Systems	GH5.82 Lab	Khuman A

(continued)

Table 10.1 (continued)

Friday

Day	Start	End	Weeks	Activity	Type	Module title	Room	Staff
Fri	9:00	11:00	1–5, 7–11	IMAT3406/Y P/06	Practical	Fuzzy Logic and Knowledge Based Systems	GH2.82 Lab	Khuman A
Fri	11:00	13:00	1–5, 7–11	IMAT3406/Y P/07	Practical	Fuzzy Logic and Knowledge Based Systems	GH6.52 Lab	Khuman A
Fri	14:00	16:00	1–5, 7–11	IMAT3406/Y P/08	Practical	Fuzzy Logic and Knowledge Based Systems	GH6.51 Lab	Khuman A

be willing to explain to a potential population of roughly 170, they are never forced to, or made to feel uncomfortable. They do so using their own volition.

There are 3 distinct teaching styles that are adopted: visual, auditory, and kinaesthetic. These are not necessarily undertaken individually, but rather they are amalgamated. One can move quite quickly from a lecture slide to a group discussion highlighting a real world example of the lecture slide, to then demonstrate this through a thought experiment. The free flowing and adaptable learning approaches do play dividends, as they allow for potentially more cohort participation. Not everyone learns and understands in the same way, being able to present and transcribe key concepts using varying teaching styles does benefit the learning quality of the group (Hsieh et al. 2011). By being able to connect what the students are learning to information they may already know, allows for them to fit new knowledge into their understanding of the topic. By allowing them to have the 'eureka' moment gives them more incentive to encourage future engagement and understanding. This is all possible, and enforced via good communication, the most essential quality when participating in a teaching environment. For the communication can be the difference in explaining something adequately well to get it, or explaining it very well to understand it and articulate from it.

Other teaching practices that the author makes use of are to be enthusiastic. From the received comments regarding the fuzzy module, the author's enthusiasm was constantly remarked upon, this can at times be infectious. However, this is a double edge sword, as too much enthusiasm in a 0900 lecture can be counterintuitive, so there must be an equilibrium between too much and too little. Regulating the enthusiasm as and when needed is a beneficial quality, students on the autistic spectrum do not take too kindly to staff that are too loud and too animated, however, given enough time and reassurance, they will often warm to you, as has been the case for the author.

At De Montfort University, a Universal Design for Learning (UDL) is adhered to, an approach to enhance learning and teaching for *all* our students. It provides a framework to identify and promote existing good practices across the institution, many of which already address the principles of UDL. Apart of this framework is DMU Replay, where it is expected that all modules across all levels, have their respected lectures recorded. This recording is undertaken using the Panopto software, which records the monitor and in doing so the current presentation, along with audio via the embedded microphone found on the lectern. Enrolled students have access to all recorded material and play them back in their own time. This has a huge benefit, as students who were unable to attend a lecture, will not miss out on the learning of the session. This is also hugely beneficial to the students who may be a part of the Erasmus Exchange, where English may not be their first language, for those students, having access to recorded sessions is invaluable.

Good communication and trust between teachers and students is also important. Saying that you will get something done is different to actually getting it done. Maintaining a good a rapport with students reduces the likelihood of insubordination, and therefore making the learning environment more enjoyable. Engaging in discussion needs to be done in such a way as to not come across as domineering, forcing perspectives onto students, even though that is technically what is happening. An understanding should be as harmonic as possible, involving the student as much as possible in the 'journey' of understanding for themselves. Connecting the dots for them is different from letting them connect the dots for themselves, as this takes away from their accomplishment.

10.3.2 Teaching Practices—The Labs

The labs for the IMAT3406 module involve the use of specialised software, in particular: MATLAB. This was chosen for several reasons; included as an additional installation package is the Fuzzy Logic Toolbox, which we make use of for quick prototyping. The toolbox is also needed for its incorporated function library which is used in the coursework when the students create their own fuzzy inference systems. MATLAB was also chosen as not many students have used it. This allows for the cohort to be on a level playing field, programming experience is not needed as the environment is unconventional. The labs are structured so that everyone is taught the necessary skills needed in order to properly be equipped for when they embark on their coursework.

The labs themselves are all 2 h lab sessions. With the main lecture being first thing Monday morning at 0900, the attentiveness of the students in attendance needs to be taken into consideration. Students are expected to attend all timetabled sessions, but as is the nature of early morning starts, especially on a Monday, one can be forgiven for NOT expecting a full turnout every time. If a student was to miss a lecture, the content that was covered would be available via the Virtual Learning Environment (VLE) , in our case, Blackboard. One has to be aware when the lectures are to be undertaken and also to what level of attentiveness the room may be. Having a 2 h lab allows for the learning objectives expected for each lecture, to be reinforced via lab work, for those that may have missed the lecture entirely. Those who did attend the lecture and also the lab, will benefit from a more concrete understanding. Having the lectures and the lab material align somewhat, facilitates this aspect of learning. Making sure that everyone knows what is needed in order to understand what will be asked of them for when they start the coursework component of the module.

It is in the labs where the author is able to be more proactive as the cohort size is a maximum of 20 students. With a smaller population, and 2 h for each session, a more involved approach is adopted. Students are expected to follow along with the lab sheet as the author will be doing the same on the projector. Seeing the lab instructor also undertaking the lab exercises provides for a more inclusive environment because they are able to follow along, or do it on their own. The time is utilised very affectively, as the demonstration of the lab material and lab sheets do not take the entirety of the 2 h session up. What the author will do is to make sure that concepts from the Monday lecture have been understood and if not, a brief recap is undertaken for the benefit of the room (Vogt and Rogalla 2009). This may involve everyone, or only the students who need it.

The author will also take the time to talk to each student individually to make sure they are comfortable with the lab exercises and the lecture content, as sometimes students may not feel compelled to raise their hand if they have a question or concern, so proactiveness on part of the lecturer should always be encouraged. As the lab groups are smaller; the attentiveness to which students are more vocal; which prefer to just get on with it and be left alone; which benefit from one-to-one, which benefit from small group discussions and so on becomes very apparent. It is playing to the strengths of the room that allow for a fruitful and rewarding lab session.

It is also in the lab sessions that the author can spend more time with students from the Erasmus Exchange. For these students may not feel entirely confident in speaking in front of the lecture group, so being in a smaller size setting should be utilised as effectively as possible. The Erasmus Exchange students will already have a good grasp of the English language so they are very capable of asking and questioning given the opportunity.

These are all aspects of dynamic teaching practices that the author adopts in presenting the fuzzy IMAT3406 module. With the background of the author and the past experiences at DMU, this has all played a part in creating and structuring a module with embedded teaching practices that allow for understanding and execution of fuzzy concepts. This has and continues to prove effective, with module gaining more popularity year in and year out.

10.4 Conclusion

There are many facets when considering dynamic teaching practices, the main objective of which should always be to foster for inclusivity, without creating an apartheid in the cohort where more energy and attention is given to a specific group. What has been put forward is a somewhat itemised list of adopted teaching practices. With that being said and done, the proof will be in the pudding, so what is to follow is a breakdown of module statistics, showing the reader how well the students actually fared. As the coursework marks were already finalised and released to the students at the end of Term 1 (December 2017), the exam was the only thing still to be undertaken, which was completed in May 2018. Final marks and weights have been calculated and as such, the following statistics can be inferred.

Of the original 165 enrolled students, 160 remained. The slight drop in number is due to interruptions rather than the module being dropped. In actuality, more students decided to join onto to module within the first 2 weeks of the academic year commencing. Of these 160 students, 3 did not attend any lectures or labs, nor did they submit coursework or complete the exam, they are however still included as being enrolled. With any module there is always a chance that you will have students whom have asked and have been granted a deferral for their coursework, the deferral date means that their coursework deadlines are now August 17th 2018. Which means, at the time of writing this chapter, they are still yet to be submitted and yet to be marked and graded. Of the 150 students whom submitted their coursework, the average mark of the cohort was an impressive 70%. The number of students whom completed the exam was 152, the average score obtained by the cohort was an equally impressive 77%. As the module is weight as 50% coursework and 50% exam, the overall module score obtained was 74%. What is to be contextualised is the module pass rate for level 6 modules here at DMU should aim to be at least 90%, the module pass rate for IMAT3406 including all students, some of which did not attend, some of which have still the coursework to submit, the pass rate is 94%.

If one was to only include the students whom submitted their coursework and sat the exam, the pass rate jumps to 99%. Given the cohort size, either figure: 94 or 99, are very impressive.

A breakdown of the mark range for the overall score for the module considering every enrolled student is as follows:

- 63% gained an overall module score of 70+.
- 21% gained an overall module score of between: 60–69.
- 8% gained an overall module score of between: 50–59.
- 3% gained an overall module score of between: 40–49.
- 1% gained an overall module score of between: 30–39. Which constitutes a marginal fail.
- 5% gained an overall module score of between: 0–29. Which constitutes a major fail. This does include the students whom still have to submit their coursework, so this value will decrease and the overall pass rate will increase accordingly.

As one can imply, the effectiveness of the teaching practices adopted have proved to be effective in obtaining the module scores. As with any HE institute, all marks and exam scripts are subject to moderation, which has already occurred, so the values you see before you are final indicators. A dynamic approach to teaching, one which fosters inclusivity will always fare well and be commended, as has been the case for IMAT3406: Fuzzy Logic and Knowledge Based Systems.

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