# 6. Conclusions and Reflections

## 6.1 Summarizing the purpose of the research ...

### ... and reflecting on the wider implications

This study has focused on trying to understand more about how the academic confidence of university students with dyslexia may be affected by their dyslexia. The research stems from a desire to apply scientific process to anecdotally observed evidence about how dyslexic students tackle their studies in comparison to their non-dyslexic peers. At two different university settings in my professional positions as an academic guide, my experience of working with both groups of students to develop their learning (and meta-learning), indicated that considerable differences exist in attitudes and behaviours in relation to academic study.

It is acknowledged that these can arise through a very wide diversity of individual circumstances and learning situations, both immediate and of historical or other origin. However, the learning difference of dyslexia uniquely sets apart a substantial minority of students from their mainstream peers as a consequence of the ways that their dyslexia is said to impact on their academic studies, not least in comparison to learning impacts attributed to other minority-group characteristics, such as ethnicity, social class or cultural differences. This is because dyslexia is considered to present unique challenges in literacy-based education systems, challenges which are based on the assumption that dyslexia is fundamentally an issue associated with literacy capabilities. The evidence for this is substantial, and not a point of specific argument in this thesis. However, there is also considerable evidence that in high-functioning adult learners, as typically seen at university, many of the earlier literacy challenges inherent to a dyslexic individual’s learning processes may have been strategically ameliorated, leaving other dimensions of dyslexia to emerge; these may then have a greater impact on actions and behaviours in academic study.

Many learners face real issues that appear to be directly related to their approaches to their academic challenges (Klassen, 2006). Examples have been cited in the literature review above, but Klassen’s view, one which resonates with the themes in this project, is that confidencecan be one of the blockages that is the source of many learning challenges, because academic confidence is the bridge that connects an individual learner's self-efficacy beliefs to their absolute performance in an academic task. This is an important idea because it implies that academic confidence is a constituent, success-forecast component of the processes that students progress through when they are travelling from facing a specific academic task demand, to the academic output that is the endpoint.

This process is likely to be partly a function of metacognitive knowledge and partly a function of intrinsic capabilities. Significant studies have explored these ideas in dyslexic students, with some of the outcomes briefly discussed in Section 2. But to summarize through a couple of examples: Butler (1998, 1999) found that dyslexic students struggle with analysing task requirements, and they often focus on lower-skill competencies such as spelling and grammar, while not recognizing the need for organizational capabilities or writing in a particular register. And Tunmer and Chapman (1996) claimed that dyslexic students can be less metacognitively aware than their non-dyslexic peers, but this may be more of a manifestation of dyslexic students' knowledge, or perhaps merely perception, that both their own, and maybe more significantly, external expectations of the quality of their academic output is reduced. These feelings may be driven by the stigma associated with the disability label (Ho, 2004), but also by reduced levels of confidence (in comparison to their peers at least) about how successful their approaches to meeting the immediate challenges of studying at university will be. Some of the outcomes of this current study suggest that these characteristics may not be unique to students with dyslexia, where evidence has been presented to indicate that many students find organizing, managing and judging the complexity of their academic workload to be challenging. Previous studies have indicated that reduced expectations may be a consequence of experiences in earlier learning, where dyslexic students built perceptions that less was being demanded of them academically, or worse, that educational opportunities were being denied to them because of their dyslexia (Shifrer, 2013; Shifrer et al., 2013; Hornstra et al., 2014). The ABC Scales used in this current study do not explore the relationship between academic *expectations* and academic confidence, and where the full, 24-dimension scale has been shown to be just as effective in a reduced, 17-item format, perhaps this spare 'capacity' would encourage a revision that could include dimensions designed to look at students' expectations. This might be a useful development of the scale, and one which would it no more burdensome to complete than the original.

But it is also possible that dyslexic students' *disability status* may have resulted in their prior learning experiences being littered with teachers who consistently misjudged their academic potential by being more focused on managing their apparent disability (Hurwitz et al., 2007). Evidence from the qualitative data collected in not only this current study, but also from the prior, Master's project conducted nearly a decade earlier, suggests that this may persist into higher education where study skills support, well-intentioned as it undoubtedly is, adds to study pressure and anxiety rather than ameliorates it for many students with dyslexia. Furthermore, early evidence suggests that students with dyslexia under-perform in the initial stages of tacking academic assignments by lacking effective means for 'sizing up the task', and hence poorly judge the complexity of the task (Borkowski, et.al., 1989). Although that study was concerned with the issue amongst primary-aged children with dyslexia, it spawned enough subsequent research to suggest a 'Strategy Deficit Model' (Swanson, 1990), as a framework for understanding it, the legacy (and model-development) of which became integrated into similar research amongst the community of individuals with dyslexia (e.g.: Lienemann & Reid, 2006; Bergery, et.al., 2017). But to assume that this is an inherent difficulty that is a consequence of the dyslexic condition excludes the possibility that the way in which the task is framed may make deciphering what to do especially challenging for individuals characterized as neurodiverse thinkers. In other words, for students with dyslexia, the challenges in properly understanding how to tackle an academic challenge, may be more a function of the manner in which the task's academic context is framed as much as any research-reported deficit in meta-cognitive awareness. It is not unreasonable to suggest that any or all of these factors are likely to impact on confidence when tackling learning challenges.

What is especially notable is that several conclusions drawn in this thesis have alluded that many of these issues may be widespread across student communities and not necessarily more prevalent amongst those with dyslexic learning differences. But what does appear to be widespread in dyslexic learners, is the enduring legacy of being ‘othered’ as a result of ‘differences’ in learning contexts, especially where this extends to stigmatization, which consequently has a detrimental impact on confidence for approaching and tackling learning tasks and challenges. Hence this thesis has attempted to demonstrate that it may be the negative effects that are associated with being identified as dyslexic that may have an abiding effect on depressing academic confidence, which then persists throughout the subsequent, situational learning circumstances - in this case, three or more years of university study. This is despite some signs of a genuine shift towards embracing better inclusivity in teaching and learning, not least through a wider adoption of learning development initiatives, which although are welcome and well-intentioned, seem, in the most part, to remain focused on designing and presenting remedial activities to upskill the academically weak, disadvantaged or disabled, an observation based my own experience as an academic guide in three, different university settings over the past decade and more. Indeed, branding services as 'study skills' or 'academic support', may inadvertently reinforce the wider perception that the target audience is the struggling learner rather than as access to learning enhancement for the whole student community. As such, most of the principles enshrined in the concept of Universal Design for Learning, greeted with wide enthusiasm and eagerness as an agent for change in learning and teaching at the turn of the century remain unadopted. All of which means that regimes at university still tend to be lacking in sufficient flexibility and adaptability to more equally accommodate learning difference, a situation which remains inherently unjust. But this is a topic for future research perhaps.

## 6.2 Summarizing the research outcomes

This research used a self-report questionnaire, completed online, by university students predominantly at one UK institution, to gauge academic confidence and dyslexia-ness. Academic confidence was assessed using the existing ABC Scale developed by Sander and colleagues in the early 2000s with later modifications, together with locally-derived variants. Dyslexia-ness was assessed using an especially-developed Dyslexia Index (Dx) Profiler which framed dyslexia using a multi-factorial approach. By collecting background data about the more general demographical distribution of the students in the datapool, it was established that the sample could reasonably be considered as a typical cross-section of a student community at a UK HE institution.

The data collected permitted two research groups to be established: one group of self-declared dyslexic students, the other, students who declared no known dyslexic learning differences. From these, three subgroups were derived using the criteria of dyslexia-ness established from the output of the Dx Profiler. These were: students with known dyslexia, validated by high levels of dyslexia-ness, (the Control subgroup); students with no known dyslexia validated by presenting low levels of dyslexia-ness, (the Base subgroup); and students with no known dyslexia but who presented high levels of dyslexia-ness, (the Test subgroup).

The research questions asked firstly whether university students who know about their dyslexia present significantly lower academic confidence than their non-dyslexic peers; and secondly whether students who indicated no formally identified dyslexia but who showed strong evidence of dyslexia-like learning and study profiles, present *higher* levels of academic confidence than their dyslexia-identified peers. From these, a further research question emerged which asked whether or not the manner in which students with dyslexia learned of their dyslexia impacted on their levels of academic confidence.

Data from the self-report questionnaire was analysed using a selection of statistical processes which first established levels of reliability of the two metrics for gauging the ABC and Dx of students in this datapool using the Cohen's ɑ coefficient. Although ɑ-levels were high for both metrics, it emerged that some scale item redundancy was present in both scales. Consequently, four variants of the ABC Scale and two variants of the Dx Profiler were developed and applied to the data. Hence, several permutations of ABC outcomes with Dx outcomes became available, and rather than select one as the definitive pair, outputs from all combinations were generated. This was considered a strength of the study because it permitted a range of outcomes to be reviewed in the context of the research questions and hypotheses. This decision was strengthened by generally very similar results emerging, whichever combination of the two metrics were chosen.

In the event, by comparing mean-average data for ABC between the groups and subgroups, it was first established that non-dyslexic students present a substantially and significantly higher level of academic confidence than their dyslexia-identified peers. It was further established from whichever combination of ABC Scale and Dx Profiler varian that were used, that there was a small-to-medium effect size between ABC means of strongly dyslexic students in the Control subgroup and strongly quasi-dyslexic students in the Test subgroup. Although it was not possible to definitively declare these outcomes as significant (according to conventionally defined criteria) they were sufficiently marginal to suggest that further research would be warranted in order to generate a larger datapool or to assemble data from several studies into a meta-analysis. Hence although the second null hypothesis that there is no difference in academic confidence between dyslexic and quasi-dyslexic students could not be rejected in favour of the alternative, that quasi-dyslexic students present a significantly higher level of academic confidence than their dyslexia-identified peers, it is true to report that in all cases, levels of academic confidence across the spectrum was higher for students in the quasi-dyslexic subgroup.

Furthermore, and in support of the stance of this project, analysis showed a moderate, ABC effect size between dyslexic students whose dyslexia had been diagnosed to them as a disability, and those who were told of their dyslexia in other ways. Thus suggesting that indicating to students that their dyslexia may be an illness, tacitly implied by diagnosing it, and that the condition also categorises them as disabled, could be a significantly impacting factor that contributes towards reduced levels of academic confidence.

## 6.3 Limitations of the research

This was a unique project. To set the objective of identifying quasi-dyslexic students from a cohort of students outwardly declaring no dyslexic learning differences, raised unprecedented challenges. To date, no other studies have been found that had attempted such an ambitious task at this level and in this field of educational research. Hence the research design devised, necessarily comprised many elements that were previously untested. The most significant of these were firstly, the design and development of a data collection tool that could be relied upon to be reasonably likely to reliably identify quasi-dyslexic students sensitively, whilst at the same time not constituting a dyslexia screener; and secondly, to build and deploy a data collection system that could be delivered to a broad range of participants, recruited into the study in ways that were unbiased, not skewed, and hence, reasonably representative of the wider community of students at a typical university in the UK. On reflection, it is acknowledged that to attempt a project of such complexity as a sole researcher, was probably over-ambitious, and possibly beyond the requirements for study at this level. But the aims of the study emerged from a deep desire to contribute something of value, that could add to the body of research evidence arguing for a transformation in the ways that students with learning differences - whether they be categorized as dyslexia or not, itself later shown to be a contentious point - are enabled and empowered to make the most of studying at university

### Scale limitations

Thus, it is acknowledged that the most critical limitation of the study should be attributed to the design, development and deployment of the Dx Profiler as the discriminator for finding students with quasi-dyslexia. This was an innovative and possibly controversial instrument for gauging dyslexia-ness, itself a term inaugurated in this study. Although an exhaustive process of development (within the limits of time and human resource) led to confidence in the Profiler’s ability to meet the design objective of this study, it remains untested outside this datapool of students. Nevertheless, and in addition to robust, theoretical underpinnings, a decent attempt was made to elicit background data from dyslexia study-support professionals working with students in universities across the UK to aid the formulation of the Profiler, even if the response from them was disappointing. With the benefit of hindsight, this process may have been more successful, were the purposes and critical value of the data that was being requested to have been communicated more clearly, this, bound with a more succinct and impassioned overview of the greater research aims that it would be contributing to. But in the interests of 'keeping it brief' so as to encourage participation from busy people, it is possible that this action was inappropriately assessed and its importance under-estimated. Hence, one limitation of the Dx Profiler might be attributed to this element of its underpinnings being considered as somewhat flaky, albeit based on strong theoretical reasoning. Although the design intention was ambitious, in execution, and due to a dearth of appropriate background data, this element may have compromised outputs to some extent. For example, the weightings assigned to the Dx Profiler dimensions were derived from data collected through this design development route. Given that the aggregated, dimensional, weighted values constituted the final Dyslexia Index (Dx) for each participant in the study, obtaining the best quality data possible from which to derive the weightings will substantial add to the precision of the final Dx value. Clearly, more data from which to have developed the weightings would have added to the precision of the Profiler.

But these features of the development of the Dx Profiler have been acknowledged throughout the discussion element of this project, and a good attempt to deal with them was demonstrated in the data analysis through statistical devices pitched at strengthening the validity of the Profiler. This was not least through formal scale reliability analysis, which, aside from outcomes suggesting that the Profiler was reliably measuring what it set out to measure, also led to an alternative, abbreviated version being devised and subsequently used in the greater analysis. However, it is also acknowledged that an inherent research weakness of this current study, may have been introduced because the design and development of the Dx Profiler could have constituted a sizeable project in its own right, and hence has been used in its nascent form. As a consequence, it is possible that this limited development may have resulted in not so much questionable, but at least, tentative outcomes. These points have also been acknowledged earlier, and it is anticipated that development work on the Profiler can be continued, hopefully following a successful submission for publication of a report of progress-to-date, which may also encourage a subsequent discussion about not just the idea of dyslexia-ness, but perhaps a wider trial of the tool so that more data can be accumulated and analysed (through meta-analyais perhaps) to aid its further refinement.

It also to be acknowledged that the standardized and relatively well-used ABC Scale is itself, under-developed, (a point raised earlier), which also might contribute to the limited generalizability of the conclusions and outcomes established from its use in this current study. It has been argued that one aspect of this scale's immaturity stems from a concern about the applicability of the standard factor structure of the scale more widely across datasets which do not closely emulate those from which the factor structure emerged. This possibility arose at an early stage of the review of studies that have used the ABC Scale, in that some studies employed the original, 24-item scale, whereas others used the reduced, 17-item version, this being a later development of the scale and demonstrated to have a substantially different factor structure. The importance of this lies with the dimensions of the 24-item scale that were removed because it was considered that such a retraction may have been especially datapool-specific, since no wider validation was found. Consequently, both through scale reliability analysis, and dimension reduction simulations (using the Eigenvalue Monte Carlo method), two alternative factor structures for the ABC Scale emerged that were entirely based on the datapool in this current study because the simulation used randomized trials of the data in this study. Together with the two original scales, which were considered to be perfectly usable despite the limitations raised (not least due to the legacy of several prior studies which have used them), this led to four distinct sets of outputs being established, the consequences of which could be argued to have conflated or obfuscated conclusions drawn about students' academic confidence.

But this cautious approach was a response to the need for data analysis processes to be as relevant and applicable as possible, and pays more than a passing reference to earlier attention drawn (in sub-section 2.1(VII)) to an example of the reportedly disappointing effectiveness of a construct-evaluating metric developed from a closed cohort sample at a single university, when the metric was used to explore the same construct as presented in a sample taken from a different university's student community (the YAA Adult Dyslexia Scale; (Hatcher & Snowling, 2002)). In that case, the scale was adapted for use in an Australian university with disappointing results (Chanock et al., 2010), attributed to the limitations of the metric as a result of its development being based entirely on data collected from a single source. The argument followed that hence, this reduced its adaptability for use in outwardly similar contexts but where (as in that case), significant differences in test-subject demographics appeared sufficient to upset the results. In the event, and in keeping with comments above about the Dx Profiler, the four versions of the ABC Scale used in this current study were considered to be a strength of the analysis process. This was firstly, because the two locally-derived scales were exactly pertinent to the locally collected data, and hence their outputs might be considered as those most likely to reflect the true characteristics of academic confidence of the students in this datapool; and secondly because, as with the two versions of the Dx Profiler considered of equal merit, the simultaneous outputs generated from the same variables could be collectively compared. Hence, both local ABC outputs have also been declared in the results and used in the analysis where apposite. There has been neither the time nor the scope in this current study to explore the differences and similarities that emerged from ABC Scales' differences in detail - which is considered as a further limitation. Early indications suggest there may be merit in reviewing and more deeply analysing the data, which remains, yet again, the topic for a future study.

### Data collection, sampling and datapool limitations; measuring issues;

Due to the researcher's geographical location, this was a distance-learning study conducted remotely from the data source - namely students attending the same, home university. By its very nature, this advocated the design of a data collection process that could also be conducted remotely. To have adopted an alternative method, such as face-to-face structured interviews, or personally canvassing for participation in a paper-based or electronically-derived questionnaire for example, would have been unworkable. But in different circumstances, either of these alternatives may have been equally productive in terms of the breadth, quality and detail of data that could have been collected. In the event, a great deal of careful thought, preparation, and prior technical expertise was invested in designing and developing a self-report, electronically-deliverable questionnaire that was technically faultless, attractive to view, easy to navigate, simple to understand, complete, and submit, and not over-burdensome in either time required to complete it, nor the complexity or wordiness of its constituent components. Alternative data collection processes were considered, but given that from the outset, this study was designed to be a primary research project where the more data that could be collected was considered the better, adopting a case-study approach for example, where the same research questions might have been meaningfully explored, was dismissed at an early stage because it was considered that although data collected could have been high-quality, it would have emerged, by definition, from a highly restrictive and not necessarily representative source, such that generalizable outcomes were considered less likely to emerge, but especially, it was difficult to see how the core, Test subgroup of quasi-dyslexic students may have been established using this approach. However, it is acknowledged that could such a research design have been formulated, it may have generated outcomes of equal, if less wide-ranging value, that is, with a different, more individually-focused emphasis.

Hence, collecting data through a self-report questionnaire, electronically delivered and submitted was considered the most viable option. Considerable credance was given to pitfalls and limitations attributed to collecting attitudinal data in this way (reported earlier, sub-section 3.3) and significant attention was paid to accounting for, and designing these out where possible. However, it is acknowledged that such a data collection process brings its own limitations: firstly, the extent to which participants respond to questions honestly, on their own (that is, without any help, or prompting), in full understanding of the content, structure and purpose of the enquiry - these factors are always beyond the control of the researcher, and hence variability in data quality and response veracity has to be an accepted source of potential limitation that will have an impact on generalizing conclusions. This is acknowledged, and where possible accounted for by suggesting outcomes as 'tentative', for example. Secondly, the target audience, unless specifically and individually identified and selected in advance, that is, purposively, is unknown. For the group of dyslexic students, however, this was partially under the control of the researcher as these participants were assumed to be definitely identified as dyslexic by virtue of them being targeted for recruitment through the university's Dyslexia Service e-mail distribution list. But for an individual in receipt of the e-mail invitation to join the study, choosing to participate was entirely voluntary. Hence, it was not possible to devise and access a nonprobability, purposive sample that would have been logically assumed to have been representative of the background population of all students with dyslexia attending the home university. In any case, such a process was precluded by the said Service who, certainly at the early stages of scoping the data collection process, were very reluctant to be involved in the study at all, citing potential breaches of confidentiality as the reason, this, despite assurances that data collected through the questionnaire were completely, irrevocably and unconditionally anonymised, with no possible route to trace responses back to an identifiable individual.

Thus, it was not possible to determine the extent to which those who were recruited to the study through this route, represented a reasonably random cross-section of students with dyslexia at the university, and so it is possible that outcomes of the analysis were skewed as a consequence. For example it was known that the greater proportion of respondents who were recruited through this route were female, outnumbering males by a factor of three to one, because identifying gender was requested in the questionnaire, with that information universally provided. But without privileged access to the gender distribution of students registered with the university's Dyslexia Service, (a request for which was submitted but no response received), it was impossible to determine how representative the female-to-male ratio of 3-to-1 actually was, and hence, whether males were disproportionately under-represented. For students recruited into the non-dyslexic group, in that case by university-wide publication of the Invitation to Participate on the student-facing intranet home page, it was at least possible to determine that the distribution of participants by gender was approximately representative of the university student population nationally, as these data were available from HESA, and compared against.

However, once the data collection process was complete, (as determined by a publicized submission cut-off date), it was considered that the datapool represented a moderately large sample (n=166) for a research study of this type, through comparison with studies explored in the literature review. When the datapool was sifted into research groups and subgroups, sample sizes were obviously reduced, although with n=98, and n=68 non-dyslexic, and dyslexic students in each group respectively, these were still considered to be sufficiently large for the outcomes of the subsequent data analysis to be meaningful and worthy of interpretation. However, given one of the principal aims of the study was to identify quasi-dyslexic students from the non-dyslexic group, it was known from the outset that the size of the resulting subgroup was likely to be quite small, and that any conclusions determined through statistical processes would need to acknowledge that small samples are likely to provide evidence for only tentative outcomes to be declared. In the event, sifting quasi-dyslexic students out of their parent group led to a Test subgroup of 18, or 19 participants, according to which version of the Dx Profiler was applied as the sieve. Within the limits and limitations of the Dx Profiler as a discriminator, this subgroup represented a substantial proportion of the parent group (18-19%), which, were quasi-dyslexia considered as likely unidentified dyslexia, may suggest the proportion of unknown dyslexia could be as high as nearly one in five apparently non-dyslexic students at university. To draw such a conclusion from this data is neither realistic nor tenable (and is not claimed), because the sample is small, the validity of the discriminator is untested outside this datapool, and from the outset, the Dx Profiler has not been claimed as a dyslexia screener. However, as with other outcomes that have emerged from this study, it is not a result to ignore or dismiss out of hand, and is not the product of a glitch in the data or a mis-analysis. It is, however, consistent with other studies' findings that dyslexia amongst university students is widely under-reported.

Finally, it is notable that a considerable attempt was made to incorporate an innovative data measurement design into the data collection tool, by adapting the tried-and-tested Likert style scale item approach for eliciting attitudinal responses from participants to the dimensions of both the ABC Scale and the Dx Profiler. This was achieved through the design and development of continuous range input 'sliders' into the questionnaire design which recorded respondents' percentage agreement from 0-100% with the dimension statements. The rationale for this has been reported earlier (Sections 3, and 4) together with comprehensive appraisal of existing limitations surrounding the collection of self-report data using Likert Scales. But in summary, the principal purpose was to devise a means to displace coarse-grained, attitude measurement, typically generated from fixed anchor-point Likert scales, with scale input devices that could more truly represent the variables in this project that were continuous in nature and by definition. By doing so, the accompanying controversy surrounding the conversion of anchor point acquired, non-parametric data into an arbitrary format, disjoint from the scales themselves, in order to permit parametric statistical tests and processes to be applied, would be avoided. Data collected through continuous scale inputs can justifiably enable parametric statistical analysis to be conducted. No other studies have been found which have incorporated such an unusual element of design functionality into a self-report questionnaire. The percentage-agreement outputs generated by the data input sliders were as continuous as could be reasonably considered possible, however, no precedents were available to consult which discuss the viability, validity and reliability of such a data collection process in comparison to attitudinal data collected by fixed anchor point scales. Hence this may be considered as a limitation of the data collection process, but one which was known at the outset rather than one which emerged out of analysis later or hindsight. But innovation is, by its very nature, without precedent, and notwithstanding the outcomes of this current study being considered as robust, and thoroughly and accurately analysed using defendable statistical tools and processes, by being (apparently) the first example of the incorporation of this relatively new mechanism in web-browser based electronic questionnaires, it is hoped that later studies will adopt similar processes for data collection, and that a body of evidence can be accumulated to explore their viability, accessibility, and the levels of data quality acquired, in order to support their use or not.

## 6.4 Directions for future research

It is believed that this study is the first to explore specifically the relationship between academic confidence and dyslexia amongst a community of university students. The research design formulated a workflow to collect data using a new and untested metric to gauge individuals' levels of dyslexia-ness, a fresh descriptor for a range of learning and study attributes that would locate all learners at university at some point on a Dyslexianess Continuum. The continuum idea emerged, and was formalized from the summary of characteristics that the British Dyslexia Association affirms as the most appropriate description of the dyslexic condition. Simultaneously, the parallel construct of academic confidence (also considered as a continuum) was gauged with the existing, Academic Behavioural Confidence Scale so that the relationship between these two variables might be meaningfully explored. Evidence collected through an innovative, online self-report questionnaire, once analysed, demonstrated firstly, that an inverse relationship between dyslexia-ness and academic confidence is likely to exist; and secondly, by exploring the academic confidence of students with dyslexia as a function of the ways in which these individuals had learned of their dyslexia, evidence emerged to suggest that those whose dyslexia was diagnosed to them as a disability presented reduced levels of academic confidence in comparison to their dyslexic peers who learned of their dyslexia in other ways.

This was a unique investigation, and further work is required across the domain of higher education to either validate the findings of this current study, or otherwise collect evidence to contradict them. At the same time, the idea of 'dyslexia-ness' needs to be more widely discussed, given that in this study it is proposed as a continuum variable, (rather than categorical one), and is used to quantify the prevalence and magnitude-of-influence of a variety of the learning and study characteristics typically associated with dyslexia - but not necessarily absent from apparently non-dyslexic individuals - and especially when the syndrome is taken as a multifactorial, information processing difference.

In this current study, the focus of the investigation has been to explore the legitimacy of relating dyslexia-ness to academic confidence (operationalized as Academic Behavioural Confidence), and further work needs to be conducted to consider whether such an interrelationship is meaningful in higher education contexts; and if so, whether the variables when gauged, taken together, and presented in a relatable fashion (perhaps in some kind of individualized profiling format) can have a useful and productive impact on helping students at university to understand more about their own learning strategies, strengths, and weaknesses. Research designs need to be formulated and executed to determine the extent to which such meta-knowledge can be channelled into guiding students towards removing their learning blockages, and enhancing study strategies so as to be more effective in travelling towards the academic outcomes at university that are a true and proper indicator of their academic capabilities.

​But further work needs to be undertaken to develop both of the metrics used in this current study. The ABC Scale, although already established, could be usefully updated to reflect the shifts in teaching and learning regimes at university, for example. Since the scale was originally developed in the early 2000s, learning systems in HE have progressed to reflect greater use of curriculum delivery through electronic and social media applications, perhaps accompanied by a reduction in large-lecture instruction. So the Scale could be adapted to reflect these changes whilst at the same time, retaining its underpinning ethos for gauging the effectiveness of students' learning strategies and study behaviours through the lens of academic confidence. Recall that academic confidence has been cited as a significant factor in the self-regulation of learning.

The Dyslexia Index Profiler was developed especially for this project and although it has served the purpose for which it was designed, it remains untested more widely. So in the first instance, it is recommended that more data should be elicited from university dyslexia support professionals, so that the dimensions that comprise the Profiler can reflect more accurately the prevalence of the characteristics and attributes that they are gauging; and secondly, a wider deployment of the Profiler to a greater range of students at university would enable a better picture to be established of the extent to which all students can be located on the Dyslexianess Continuum. When more data has been accumulated, a deeper investigation of the factor structure of the Dx Profiler could be undertaken, as the limited data available in this current study was only sufficient to hint that a factor structure may be determinable. As a result of likely refinements of the scale, it may be possible to develop a reframing of how dyslexia is understood in adult learners, especially if this can lead to a wider debate about how appropriate or useful it is to formally identify the syndrome. Given that current convention leans towards retaining a process of identification, a deeper exploration of the impact of 'diagnosing' the syndrome is recommended, especially where this subsequently results in dyslexia being defined as a disability to the individual concerned. Perhaps more evidence to support the conclusions of this current study in this respect, might encourage a more widespread uptake in describing dyslexia more neutrally to those identified with it.

Lastly, there remains a considerable quantity of data collected in this current study that warrants deeper analysis. For example, at present, assessments of the interrelationships between dyslexia-ness and academic confidence have been mostly confined to the complete scales, although the factor structure of the ABC Scale has been explored and accommodated into the analysis. But outcomes for ABC Scale item dimensions are available, and it would be worth exploring whether the broader differences in ABC that have been revealed between non-dyslexic and dyslexic students in this current study can be more clearly related to specific dimensions of study behaviour as gauged by each dimension in the Scale. Knowing more about this might provide a deeper understanding about how identified dyslexia impacts on learners' confidence when approaching specific components of learning within the wider regimes at university.

## 6.5 Concluding remarks

What are the outcomes of this research saying about the academic confidence of students at university? What has emerged about the nature of dyslexia in students at university, and how has this contributed to what is already known about how this substantial minority of learners function and engage with university study? Specifically, what has been revealed about the inter-relationships between these two variables? And has enough been established to speculate, in a reasonably informed way, about how university teaching and learning could be adjusted in the light of evidence presented in this current study?

The aim of this project was firstly to establish evidence of, and then to quantify a significant disparity between the academic confidence of non-dyslexic, and dyslexic students; and secondly, to explore the effects that attributing the label of dyslexia to a particular set of learning and study profiles might have on academic confidence. This may be of critical importance in the field of learning design in higher education contexts, because by establishing substantial, even significant differences, it may be possible to infer that a reduced likelihood of gaining strong academic outcomes may be at least partially attributable to lower levels of academic confidence, which, as a sub-construct of academic self-efficacy, has been previously reported as a potential marker for academic performance (Honicke & Broadbent, 2016). Hence it would be reasonable to suggest that minimizing impacts that can be shown to depress academic confidence - of which identifying dyslexia maybe one - are likely to have a positive affect on academic achievement.

In short, when it comes to guiding learners towards a good degree at university, this project has first established that amongst the community of learners at one university, and based on one reasonably sizable datapool, there may be in inverse relationship between levels of dyslexia-ness and levels of academic confidence; and secondly, the study has asked whether is it better to label an individual as ‘dyslexic’, or not, and has shown that the answer to this may not be as straightforward as previously imagined. By locating all participants in this study on the Dyslexianess Continuum, and attempting to identify a discrete subgroup of individuals presenting quasi-dyslexia-ness, it has been shown that through the lens of academic confidence, there may be evidence to suggest that in some cases learning differences that might be attributable to dyslexia, are best left unidentified. It logically follows that for these individuals, and possibly dyslexic students generally, it may be better to remain unaware of their ‘learning difference’. This may mean that these learners should be encouraged to battle on as best they can within the literacy-based system of curriculum delivery in which they are studying, despite it not being suited to their learning characteristics, strengths and preferences, because even though this approach may be viewed as disproportionately challenging, the costs of undertaking a formal dyslexia assessment, possibly leading to a 'dyslexia diagnosis' may outweigh the apparent benefits of remaining ignorant of the fact. In taking this course of action, controversial as it may seem, there would be no need for recourse to traditional and undoubtedly, well-intentioned ‘reasonable adjustments’, which carry the unfortunate, additional consequence that identifies students with dyslexia as ‘different’ from their peers, leading many to be 'othered' and rejected by their apparently more 'normal' fellow students, especially in co-operative learning initiatives. Evidence for this has been presented throughout this study, both from prior literature reviewed, from the previous Masters level small-scale study, and from this current research project.

However, it has been shown that dyslexia remains difficult to define because it can comprise a variety of arguably identifiable characteristics and dimensions which can occur together in multiple combinations, may not have discrete impacts on learning, and in some cases are comorbid with other conditions or personal circumstances that may be less challenging to define and compensate for. But it has also been shown that some of these profiles of dimensions are observable in many non-dyslexic students too. In academically capable individuals, the more conventionally considered characteristics of dyslexia associated with weak literacy skills can have been significantly ameliorated, either through strategically modifying intrinsic approaches to learning, consciously or unconsciously, or through use of external support resources in the form of digital and assistive technologies such as spell-checkers or text-to-speech applications. The outcome is that many of the earlier issues that a dyslexic individual might have faced in their learning-experience history may be less significant than they were. This has been readily demonstrated when dyslexia is considered as a multifactorial learning difference, whereby individuals can present significant levels of dyslexia-ness in some factors but not necessarily in others. It might be argued that all of this merely masks dyslexia, and as a syndrome, it remains as inherently a part of the individual however its manifestations are observable and possibly measurable. But whilst dyslexia continues to be difficult to define, the value to the individual of identifying it, assessing it and somehow quantifying its severity or magnitude of influence, seems dubious.

This leads to an acknowledgement of, indeed, strong support for the view that dyslexia might be best considered as an information processing difference at university rather than predominantly a literacy-skills disability, although the literacy demands of academic study continue to present disadvantageous conditions for many students with information processing differences, because curricula are still broadly delivered and assessed in literacy-based formats. A more appropriate way to repackage dimensions of dyslexia-ness in a contemporary university-learning context may be to consider these characteristics more broadly as academic learning management dimensions, not least because many of them are widely observable across the diversity of university student communities. By characterizing any student’s blend of dimensions through a profile approach, based on a continuum interpretation of both dyslexia-ness and academic confidence for example, a better understanding can be gained of strengths and weaknesses. Subsequently, this could be the agent for learning development strategies to be designed and individually-tailored that would capitalize on strengths and ameliorate weaknesses, and hence enhance the effectiveness of learning, enable students to gain a working understanding of their own metalearning, and to reflect, perhaps with help, on how this knowledge about how they learn best, can be developed, enhanced and actioned. This could be a basis upon which comprehensive, personalized learning plans could be developed, which although not a new idea, could be revisited through the lens of dyslexia-ness and academic confidence. Hence, these would emerge as useful not just for students with dyslexia (where it deemed still necessary to formally identify them), but for anyone studying at university. Since academic confidence is “a mediating variable that acts between individuals' inherent abilities, their learning styles and opportunities afforded by the academic environment of higher education” (Sander & Sanders, 2003, p4), gaining a greater understanding of how it impacts on academic outcomes would be a conduit for enhancing these outcomes and creating a more fulfilling and less stressful learning experience, which, in the end, promotes better academic achievements that are more likely to accurately represent individuals' abilities and capabilities. Granted, this may challenge the scope of strategic planning for the future of tertiary-level, high-quality learning, because it may be considered radical, difficult, and expensive to implement, and may be inhibited by organizational and systemic factors that are resistant to change (Simons et al., 2007).

​In short, as universities have opened their doors to a broader spectrum of students through widening participation and alternative access schemes (which have also seen a substantial rise in numbers of students with learning differences choosing to enter HE), it is reasonable to suppose that many of these new faces, together with many of the more traditionally-seen ones, would benefit academically were there a better institutional-level understanding of the impact that individual differences can have on educational engagement and ownership of learning (Conley & French, 2014). Adopting the principles of UDL would meet many of these objectives by ensuring a more accessible, flexible and adaptable learning provision at university, that would enable not only students with dyslexia (whatever that means), but all students to engage more equitably with learning, using the academic and functional capabilities that they bring to their institutions, unhindered by burdens of judgemental 'difference-identification', or any other potentially marginalizing factor.