The Other Side of the Instruction Differentiation Process: Pressures on the Teacher

Thomas YH Chan [1], Allison Wong [2]

[1,2] Caritas Institution of Higher Education, Hong Kong.
Email : [1] tchan@cihe.edu.hk, [2]aliwong@cihe.edu.hk

Abstract

This paper aims to explore the viability and applicability of differentiated instruction in tertiary education in Hong Kong. At Caritas Institute of Higher Education (CIHE) in Hong Kong we conducted a study to probe into students' and teachers' views and reflections towards differentiated instruction in the ESL/EFL Classroom. Some three hundred health science and social science students were invited to participate in the research study, and three tiered tasks were created and implemented to enhance students' learning motivation, to determine their learning difficulties, and to record classroom engagements in a 13-week semester. Contributing factors including learning motivation, classwork preference, affective factors, and other educational factors have been assessed by means of a student survey and through one-on-one interviews. Feedback was also collected from three participating teachers and 25 representative students on a voluntary basis. The study has thrown positive light and suggests that a perception difference is found between students and teachers in influential educational factors. Both teachers and students have shown favouring the differentiating teaching and learning approach. Doubtless, further research work is required for refining differentiated instruction to maximize its effectiveness.

Index Terms— differentiated instruction, ELP, ESP, higher education.

1.   Introduction

In recent years to address this issue of ever-growing classroom diversity in English language teaching, both teachers and researchers in the field worldwide have been calling for a change of approach and strategy [1]. Today, students are diverse and come in all categories in terms of background, socio-economic status, readiness for instruction, culture, learning profile, interest, familiarity with technology that aids and supports teaching and learning, and so on [2][3][4]. Various researchers and practitioners in the field have been calling explicitly for the introduction of differentiated instruction as an effective approach to attend to the learning needs of different students in the classroom with high heterogeneity so that students with diverse needs will be able to attain a good proficiency level [4][5].

2.   Rationale for our research study

As a result of inclusive education in Hong Kong, as well as worldwide, today's English language classroom everywhere reveals an ever-increasing student diversity, so much so that the traditional 'one-size-fits-all' approach to teaching and learning is no longer tenable [6][7]. Students come to a class bringing with them their diverse backgrounds, learning styles, motivation, attitudes, interests, abilities and family support. The diversity of students in a mixed-ability classroom can result in a significant challenge for the teacher in meeting the learning needs of all students. To address this problem, differentiated instruction (DI) has been considered as an approach as well as a philosophy to cater for learner diversity [1][6][8][9] and also a possible way to enhance teaching and learning [10]. It is the goal of differentiated

instruction (DI) to reach out to each student and deliver the lesson in a way that fits their readiness, interest and learning preference.

Differentiated instruction is based on a strong theoretical foundation which includes constructivist theories, brain-based research and multiple intelligences [11][12][13]. To date, many of the studies are qualitative in nature, indicating positive affective outcomes in terms of motivation, task commitment, and attitudes about learning [14][15], and past studies undertaken to investigate the effectiveness of differentiated instruction focused on such subject areas as Mathematics [16][17], Reading [18] and Science [19], principally in L1 (first/native language) context and seldom applied to second language acquisition (SLA).

However, extending the research focus to college students is important, because the growing diversity within today's classroom underscores the necessity for a "pedagogical shift" [20] from a teacher-centred, 'one-size-fits-all' method to a learner-centred differentiation of instruction, at all levels in the entire education system. Such a pedagogical shift has motivated this research team to conduct the present study.

3.   Differentiating the instruction or the curriculum

Taking reference of the contention that the 'one-size-fits-all' approach is no longer effective in today's ESL Classroom [7][21], the point of departure for the present study is therefore to examine, in a Hong Kong post-secondary institution (namely, Caritas Institute of Higher Education CIHE) how English teachers attempt to innovate in their pedagogical practice by implementing differentiated instruction in the local ESL context. To date our study has shed some light on how differentiated instruction may be integrated into the Hong Kong ESL Classroom to improve student learning in similar L2/ESL contexts, contributing to the existing research base for differentiated instruction for ESL in particular. Indeed, since merely differentiating the instruction on any single English language course, albeit as a starting point, may not be too impactful, and necessarily limited in both scope and dimension, therefore, this study proving effective, the next step forward should be and would be differentiating the curriculum for ESL teaching and learning at tertiary level in Hong Kong.

4.   The teacher's perspective

Extant research has also shown that differentiation of instruction is beneficial not only to students but also to teachers. Affholder [22] reported that teachers in the study employing higher levels of differentiated instruction strategies showed elevated self-efficacy and readiness to assume greater responsibility for student growth and learning. Another study by McAdamis [23] reported that teachers in the study initially resisted changing their teaching practice; however, the adoption of strategies like peer coaching, action research and staff development workshops offered them ongoing support and feedback. This resulted in the teachers becoming eventually convinced of the benefits of differentiation, as they witnessed improvements in their students' learning and motivation. They were then eager to continue adopting differentiated instruction on a regular basis.

Nevertheless, despite the positive impacts of differentiated instruction on teachers' development of teaching practice as shown in the above studies, a number of challenges are faced by college

instructors in implementing differentiated instruction, such as large class size, time constraints and limited contact hours with students [24]. Furthermore, as shown in related literature, while English teachers overseas have long been enacting some of the strategies of differentiated instruction such as collaborative teaching, grouping, tiered activities, and tiered assignments in their teaching practice, there is as yet no evidence that such strategies have been widely adopted in Hong Kong schools or colleges.

5.   The Research Study programme

In view of the above considerations, one of the objectives of the present study is therefore to explore how local English college teachers go about implementing differentiated instruction as a pedagogical approach to cater for learner diversity through collaborating with the researchers. This study, action research in its nature and indeed research by teachers for teachers, will thus pedagogically contribute specifically to the professional development of English teachers both as teachers and as researchers, as well as to the future development in implementing differentiation instruction in Hong Kong ESL setting at the college level. The findings generated from this study will provide preliminary data for translating research-based differentiated instruction into workable, school-based interventions and, eventually, into ESL classroom practice [25][26].

The present study therefore aims to fill the research gaps identified earlier and answer the following research questions:

1. How do college teachers develop and implement differentiated instruction in English teaching and learning?

2. What is the effect of differentiated instruction on college students' English proficiency and motivation?

This study has investigated the development and implementation of differentiated instruction for ESL teaching and learning in a self-financing post-secondary institution in Hong Kong, where the conventional 'one-size-fits-all' pedagogical approach has been adopted in English teaching and learning for many years. It has also explored the effect of differentiated instruction on college students' English proficiency and motivation. Mixed methods have been used in this case study, involving multiple sources of data, including questionnaires, teacher, and student interviews, pre-and post-tests, and lesson observations.

Four English instructors have participated in this study on English language courses for over 350 degree students, exposing them for the first time to a differentiated instruction approach on the course for 13 weeks in semester 2 of 2021-2022.

6.   Research Study Design and Methodology

As mentioned, all participating students were administered a screening test to reflect their initial respective entry levels of English on Day One – in week 1 of the semester. The screening test, modelled on the EU-B2-Track Test, was conducted online and students' scores were immediately recorded and analysed in the form of pie charts and histograms, which were then fed back to the teachers for streaming purposes.

Since the participating teachers had been briefed well in advance on the three tiered tasks for targeted differentiation of the instruction at three intervention points, the progress of the differentiation was very smooth. At each point students worked out the tasks conscientiously, generating sufficient data for collection and analysis, while at the same time our research colleagues observed and recorded the entire process on Zoom for analysis.

Despite the fact that the semester in question took place in the midst of COVID-19 in Hong Kong and face-to-face teaching and learning was replaced by the online mode on Zoom, our participating teachers made an extra effort and went out of their way to successfully motivate and induce students to interact on the course and guiding them along in working through and working out the tiered tasks, for which the research team was extremely thankful.

A. Preparatory Work

Tiered Tasks tailor-made to accommodate students' learning needs were prepared and carried out by all Nursing and Social Work students in tutorial sessions on their ESP courses, with experimental and control groups.

Tutorial sessions U, V, Q, R, S, and T in Nursing and session B in Social Work were the experimental groups for which students' work was closely monitored, while tutorial sessions W, X, Y, and Z for Nursing students and the tutorial session A for Social Work students constituted the control groups. The two parameters helped to examine if close monitoring and tailor-made support would be required for successful differentiated instruction in tertiary education.

Tiered Task 1 aims to strengthen students' skills in vocabulary building. Medical terms with Greek word roots, prefixes, and suffixes are introduced to Nursing students; Latin word roots, prefixes and suffixes are introduced to Social Work students. Group activities are changed to individual activities for Nursing students. Nursing students are asked to complete one reading task and three in-class activities while Social Work students are split into two groups to complete one reading task and one group activity in class. Class observation is made for Tiered Task 1.

Tiered Task 2 aims to facilitate peer learning in inference-making. Students are encouraged to discuss with peers to complete a comprehension exercise. Group activities are changed to individual activities for Nursing students. Social Work students are split into four groups for an assigned reading task. Each group discusses, presents, and comments on one other group's presentation. Class observation is made for Tiered Task 2 for Social Work and students' involvement in discussion is observed and recorded for analysis.

Tiered Task 3 aims to facilitate peer learning in reading strategies. Students are encouraged to discuss with peers to complete a comprehension exercise. Group activities are changed to individual activities for Nursing students. Social Work students are put into four groups; free riders are put into two groups to encourage active involvement. Class observation is made for Tiered Task 2 for Social Work and students' involvement in discussion is observed and recorded for analysis.

_____

B. Participating Students

All Nursing and Social Work students enrolled in Year 2 ESP courses at CIHE in semester 2 of 2021-2022 were included in this study. Three English teachers who had attended a series of training sessions in differentiated instruction participated in the research study.

C. Schedule

1. Screening assessment and screening survey were administered in the tutorial sessions in Week 1 by using the EU-B2 Track Test in online mode. Based on the screening test scores students were differentiated into three ability groups.

2. All participating students carried out the three sets of tiered tasks respectively in Week 4, Week 7, and Week 12 on the Nursing ESP courses and Week 4, Week 8, and Week 11 on the Social Work ESP courses. (The one-week difference in implementation for these two types of students was to avoid their scheduled tests and presentation schedule on the courses.)

3. A post-study assessment and post-study survey were administered in Week 13 to all students.

4. Right after Week 13, on completion of the courses for the students, three mass emails were sent to invite both Nursing and Social Work students for one-on-one post-study interviews. A significant number of participating students responded and each of the interviews took on an average of 35 minutes to complete.

5. Focus groups separately with students and teachers were then conducted from Week 13 to Week 17 based on the availability of the students and the teachers.

D. Measurement and Tiered Tasks

Part of the EU-B2 TrackTest [27] was chosen to measure students' English skills because of its high test reliability (Cronbach's Alpha = 0.82) and validity (Kappa = 0.83, ρ <.001) in assessing English skills (i.e. grammar, vocabulary and inference-making).

The short version of "Approaches and Study Skills Inventory for Students" (ASSIST- S) [28] was employed to measure the depth of students' learning approach, also on account of its high reliability (Cronbach's Alpha = range between 0.75 and 0.83) and high validity (KMO = 0.769). The inventory contains 18 items for assessing students' preference for deep, strategic or surface approach, on a 5-point Likert scale (5 = Agree, 1 = Disagree).

The survey posed ten questions to learn about students' learning motivation; self-perceived English ability; perception of educational and affective factors; classwork preferences (e.g., individual work or group work); among others. Responses were collected using 4-point or 5-point Likert scales and checkboxes. The screening survey and post-study survey were identical. Survey completion was voluntary, and self-identification was optional.

7.   Data ANALYSIS AND INTERPRETATIONS

A. English Proficiency Assessment

The Nursing students performed better than the Social Work students in the post-study assessment. The class average score of all 10 Nursing tutorial classes was 17.16 and the class average score of the Social Work class was 15.10 in the screening assessment, while the Nursing

students scored on average 19.99 in the post-study assessment and the Social Work students scored an average of 16.42.

The class averages between the experimental and control groups were significant in the screening but not in the post-study assessment. Improvements were observed in both the Nursing and Social Work students in English ability, with the significant differences revealed in the pre-course screening (M = 16.97, SD = 3.47) and the post-study test (M = 19.49, SD = 2.43), $t(10) = 9.60$, $\rho < 0.001$. Significant improvements were observed in Grammar [$t(576) = 3.15$, $\rho < 0.005$], Inference-making [$t(576) = 10.54$, $\rho < 0.001$], and the Total score [$t(576) = 6.74$, $\rho < 0.001$]] between the pre-course screening and post-study assessment tests. Among all test takers, 40.54% passed the pre-study screening test at baseline and 67.73% passed the post-study assessment test.

In the low ability groups of students, significant improvements were observed in overall score [$t(10) = 4.67$, $\rho < 0.001$], Grammar [$t(11) = 2.58$, $\rho < 0.05$] and Inference-making [$t(10) = 5.47$, $\rho < 0.001$] as shown in Fig. 1. In the averaged ability groups, significant improvements were observed in overall score [$t(10) = 11.20$, $\rho < 0.001$], Grammar [$t(10) = 3.06$, $\rho = 0.01$], Inference-making [$t(10) = 5.69$, $\rho < 0.001$] as shown in Fig. 2 and 3. No significant change was observed in the high ability groups, which may warrant some pondering and should provide "food for the next research study".
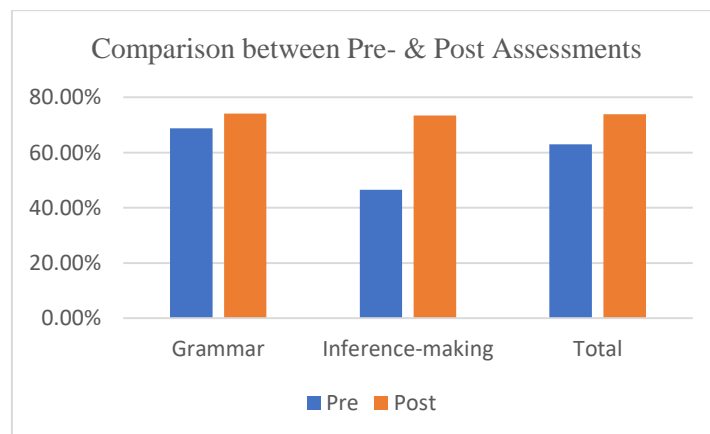
Fig. 1. Overall improvements is observed in pre- and post assessments.
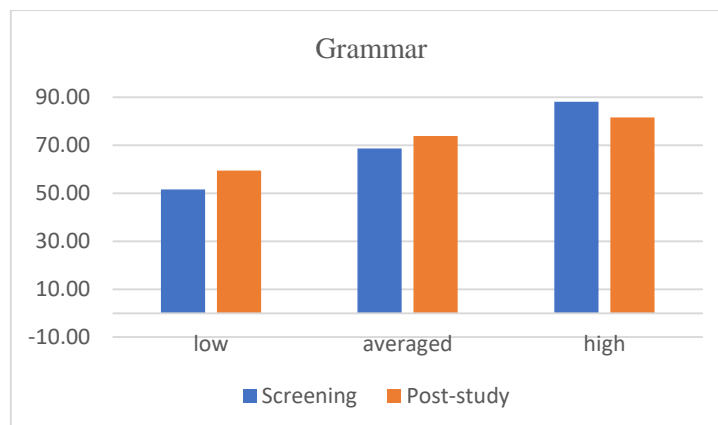
Fig. 2. Significant improvements is observed in low and averaged ability groups.
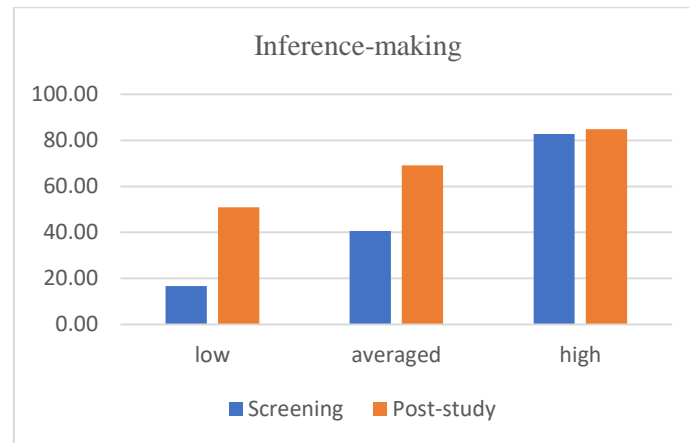
Fig. 3. Significant improvements is observed in low and averaged ability group.

B. Groupings and Performance of each Ability Group

Students were organized into three ability groups to determine if the tiered tasks would make different impacts on students with different English abilities.

The three ability groupings were carried out by the mean score rather than by the standard EU-B2Track Test passing score, because the mean score is 16.44, which is 1.56 below the passing score of EU-B2Track Test and the standard deviation is 2.36. As such, students with a score below 14 were grouped as low ability, students with a score above 20 were grouped as high ability, and students who scored between 14 and 20 were indicated as the average ability group.

ANOVA: Single Factor suggests that students' performance changed between the screening and post-study assessments and between each of the tiered tasks. The result suggested that the performance of both low ability [($F_{(2, 18)}$ = 6.06, $\rho<0.01$)] and Averaged group [($F_{(2, 18)}$ = 3.88, $\rho<0.05$)] differed significantly between the tiered tasks.

A strong positive correlation was found in both low and average ability group between the screening score and that for Activity 3 of Tiered Task 1 (r = 0.76 & r = 0.78). Moderately negative correlations were found in the high ability group between the screening score and that for Activity 3 of Tiered Task 1 (r = -0.65). Likewise, the same phenomenon transpired the low ability group, indicating a negative correlation between the screening score and the total of Activity 1 and Activity 2 of Tiered Task 1 (r = -0.79). Strong negative correlation was revealed in the high ability group between the screening score and the total for Activity 1 and Activity 2 of Tiered Task 1 (r = -0.58), and in the low ability group between the screening score and that for Tiered Task 3 (r = -0.74), Tiered Task 2 (r = 0.71).

C. Study Approach

A weak correlation was found between students' deep learning approach and English ability (r = 0.18) in the pre-study screening assessment scores. An increase of 20.18% and 3.95% were observed in the average ability group and the high ability group for deep learning approach adherence. By contrast, a decrease of 14.58% was observed in the low ability group for deep learning approach adherence.
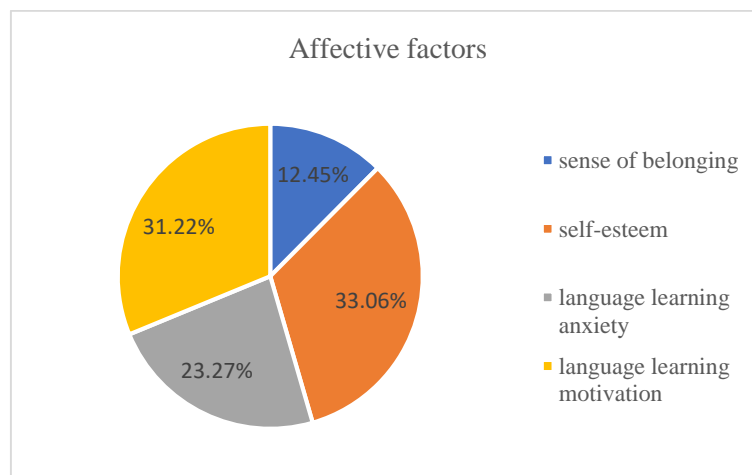
D. Survey Data

This survey did not reveal any significant change in self-rated learning motivation, the influence of education factors, English ability, comprehension ability, and the English ability gap between peers.

Of the four affective factors, self-esteem accounted for 33.06% for selection and became the most impactful affective factor in English learning in the screening survey, while language learning motivation accounted for 31.22% for selection as the most impactful affective factor in English learning in the post-study survey. These two affective factors were frequently selected by participating students in both screening and post-study surveys as show in Fig. 4.
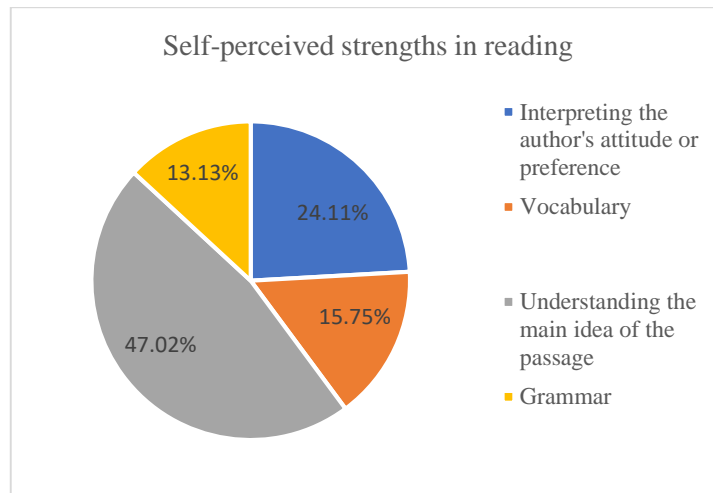
Of the four areas of comprehension abilities - Interpreting the author's attitude or preference, Vocabulary, Understanding the main idea of the passage, and Grammar - understanding the meaning of the passage accounted for 47.02% and 43.06% in the pre-study screening and the post-study surveys respectively as the most selected self-perceived strength in reading, as shown in Fig. 5. Interpretation of the author's attitude or preference ranked as the second strongest strength in reading, accounting for 24.11% and 22.01% for selection in the surveys respectively. Vocabulary accounted for 36.85% and 31.58% for selection as the ability students intended to strengthen, as shown in Fig. 6. Vocabulary was also the most selected weakness in both screening (39.53%) and post-study surveys (38.43%), as shown in Fig. 7.

Among the survey responders, 53.29% perceived educational factors influential in English learning, 57.68% are somewhat motivated to learn English, 65.20% perceived their English skills fair, and 59.56% perceived their comprehension skills fair. More than half of participating students (50.16%) perceive some English ability differences between peers and 45.45% of students perceived their English skills are at the same level. Among three preferences in classwork (i.e., small group for gameplay, small group for presentation, discussion and role-play, and individual work), small groups for gameplay accounts for 39.13% and become the most selected classwork preference in the screening survey. However, individual work accounts for 36.78% of the post-study survey and becomes the most selected classroom preference.
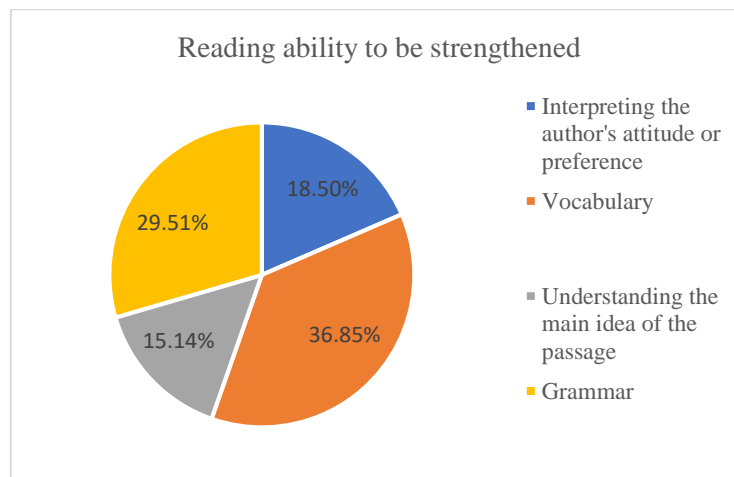

Fig. 4. Influential affective factors selected by students in the screening survey.
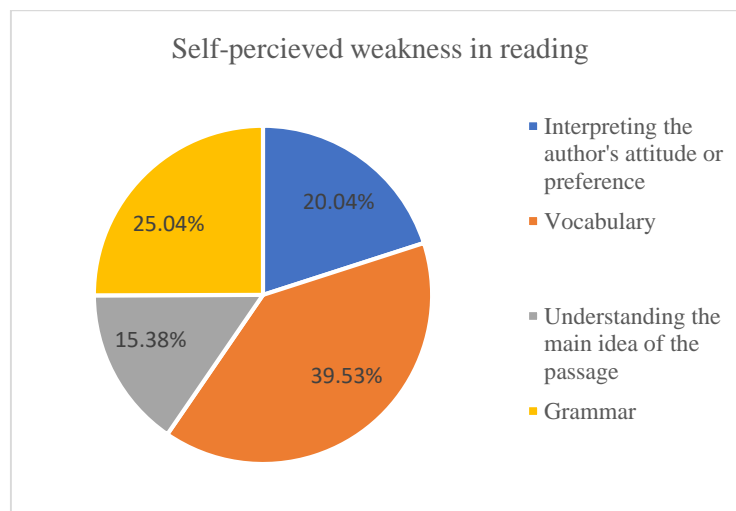
Fig. 5. Self-percieved strengths in reading selected by students in the screening survey.

Fig. 6. Reading ability students indicated to be strengthened in the screening survey.

Fig. 7. Self-percieved weakness in reading selected by students in the screening survey.

8.   Participating students' perceptions and feedback

Twenty-seven students participated in the feedback interviews, two from the Social Work Stream and 25 from Nursing.

It has transpired that in free conversation students provided us with feedback on much more than what took place for them in working out the Tiered Tasks. This is most rewarding and points to the need to seriously take into account students' learning styles, anxiety factors, preferences and interests and the overall learning atmosphere and environment, and other factors, to meaningfully differentiate instruction for optimal effectiveness.

Students' overall impression of English classes/courses is often related to the relevance of the course content both to their field of study/professional direction and to pedagogical factors. Thirteen students commented on the course content in terms of its relevance to their field of study, degree of difficulty and applicability for their future work environment; fifteen students commented on pedagogical factors such as teachers' teaching styles, clarity of teaching/presentation, knowledge of Nursing-related information and real-life situations, supportiveness, and the focus, difficulty and examination format of the course; while three students associated class enjoyment with the difficulty of the course content, and another three students related their boredom to the lack of in-class activities.

Overall, students considered the quality of learning experience, work style and fairness in selecting a work preference. Seven students found group work helpful in enhancing the learning experience; three students appreciated the opportunities to learn from peers in group work; four students were concerned about the fairness in work-splitting, four students about the excessive time and communication associated with group work, and one student about the time and work flexibility in group work.

In summary, most students (55.55%) commented on their lecturers' teaching style and 48.15% commented on the applicability of the course material. Educational factors seemed to be influential for many students in English learning. Twenty students (74.07%) indicated an end goal of English learning is to be able to communicate in English. Only 33.33% of the students interviewed regarded communication skills are for work, suggesting that most students regarded enhancing their overall language competency over professional competence in English. Two-thirds of students interviewed (66.66%) favour small group learning, showing that small group in-class activities are conducive to increasing classroom engagement in English learning.

9.   the participating teachers' perceptions and observations

The interviews with all the participating teachers revealed that they were in consensus regarding the following observations:

1. Students are motivated to learn English when the course material is closely related to their field of study.

2. Students are willing to engage and become very attentive to the class when the classwork/assignment counts for the course grade.

3. Students' learning motivation and engagement are difficult to observe in a virtual classroom, in which students and teachers interact using the 'chat box' function on Zoom, with relatively fewer verbal exchanges taking place compared to face-to-face classroom teaching and learning.

4. Activities that involve role-play and scenarios help students to adopt the new knowledge.

5. Real-life, work-related examples help to engage students in English discussion.

6. Students' academic performances (previous course grades, standardized tests) are informative and useful for understanding students' weaknesses, strengths, and learning outcomes.

7. Different teachers' views on the impact of affective factors and educational factors on learning motivation vary.

One of the teachers attempts to build a sense of belonging in students by allowing students to select their group mates. A Social Work class teacher relates the affective factors to students' self-efficacy and self-competency. Another Nursing class teacher relates students' learning attitudes to their perception of work preparation.

Teachers believe that the curriculum plays a role in mediating students' attitudes towards English learning. They believe that the teaching style plays an important role in learning engagement.

Overall, in summary, it may be maintained that the participating teachers focus very much on students' academic performance and overly rely on course grades in understanding their learning needs. They do come across as aiming to prepare students to meet the existing language standards or the career-related standards rather than raising and enhancing students' interest in English learning. Therefore, practical application becomes the teaching goal. For the teachers the theoretical benefits of differentiated instruction are not in doubt, however, the Nursing class teachers are less enthusiastic about differentiating students in the classroom on account of the extra work entailed to cater for different students' different abilities. With a rather heavy workload, this defensive stance is understandable, and this is exactly an area we would look into in our next study, namely, differentiating the instruction from the perspective of the teacher.

10.   impact of the research study on the teachers

A. The Participating Teachers' Feedback

Despite their consensus regarding the effectiveness of differentiating part of the instruction, notably during the three intervention points respectively at weeks 3 or 4; 7/8; and 11/12, the participating teachers' views towards the impact of affective factors and educational factors on learning motivation varied. Since this research study focused largely on students' reading and vocabulary development abilities, affective and educational factors were not taken into account for the overall effectiveness appraisal of the differentiation. Nevertheless, it was opportune for the research team to see such factors revealed in the process and relevant data were recorded accordingly.

B. Constraints imposed by the curriculum and the institutional culture

It must be emphasized in the context of determining the pressure that the participating teachers felt and that they were actually under in taking such an active part in this research study that they were under constraints from the curriculum and from the institutional culture all the time. On the one hand, there was the pressure of "completing the syllabus" dictated by the curriculum, and on the other hand, there was the invisible pressure to live up to 'course evaluation' by

management on course completion. In other words, the teachers needed to come up with an acceptable student performance graph showing a fair distribution of grades, while securing the same time students' positive feedback on the course and on the teaching. Having stated that, the research team must extend a heartfelt thanks to our participating teachers who went out of their way and took the time and made the effort to collaborate with us to accomplish the task.

Generally, the teachers focused rather heavily on students' academic performance and their grades. They aimed to prepare students to meet the existing language standards or the career-related standards. Therefore, the practical application was the teaching goal. The theoretical benefits of differentiated instruction were not in doubt, however, Nursing teachers hesitated to differentiate students in the classroom because of the extra work to cater to students with different abilities. Furthermore, extra manpower was required for addressing different ability groups' needs in a differentiated classroom and the follow-up work, if any, to ensure effective feedback was provided to each ability group – this was not really available for the study at the right time.

C. Impact of this Research Study on the Participating Teachers' Professional Development

Despite obvious pressure dictated by extra work for the teachers collaborating in this study, it must be pointed out that they all felt that it was a rare opportune moment for them to move on academically and professionally because they saw it as a chance for them to sharpen their practice and their thinking about English language teaching and learning. The research team was very happy to detect it and found it a very positive feature in the differentiating process. This being the case, the participating teachers found it a kind of pay-off for them to advance on their professional career paths.

D. Scanty Research To Date on Teachers' Perspectives of the Instruction Differentiation Process Warrants Further Work

The phenomenon such as mentioned above has been echoed in recent literature, albeit mostly in the West, predominantly in the United States and Europe. For example, a comprehensive literature review focusing on the impact of differentiated instruction on teachers was attempted in [7].

Another two papers that deal with the same or similar phenomenon also focused on work conducted in the United States. Moreover, all these papers are outdated, published respectively in [29] and [30]. Therefore, much more work needs to be done in this respect back home here in Hong Kong.

11. Conclusion

Based on the discussion of the data collected from this research throughout the entire process spanning the 13-week course duration and right afterwards in one-on-one interviews and focus groups, and taking reference of inferences from the analysis of the data, it has transpired that not only has differentiated the instruction for the participating students in all the sections/classes made a difference in students' academic performances, (which have thus led themselves to at least three different categories of improvement beginning from the first intervention point all the way to the end of the course), but more significantly, the study has identified different students'

learning styles, psychological factors impacting their learning, their preferences for group work and other factors such as readiness and willingness to learn, and overall interests. This outcome corresponds closely to the classic model for differentiated instruction (notably, Tomlinson and Moon, 2013).

This research study has also revealed teachers' anxieties and pressures in earnestly differentiating instruction. This is also an important factor that must be taken into account in our next attempt to further refine the differentiation process for outcomes favourable not merely to the students, but perhaps even more significantly for the teachers' professional development.

The above notwithstanding, it must be emphasised that despite initial pressure felt by the teachers, all of our participating teachers were very positive about the differentiated instruction approach and found their teaching much more rewarding and their students making better progress and reaching a higher level on course completion.

Based on the data collected and analysed, and on the interviews and questionnaire data, this study warrants further work undertaken soon to establish a rationale for differentiating instruction for teaching and learning in the ESL and ESP classrooms at the tertiary level in the Hong Kong context.

References

[1]   C. A. Tomlinson and M. B. Imbeau, Leading and managing a differentiated classroom. Moorabbin, Vic.: Hawker Brownlow Education, 2010.

[2]   D. Lawrence-Brown, "Differentiated instruction: Inclusive strategies for standards-based learning that benefit the whole class," American Secondary Education, vol. 32, no. 3, pp. 34–62, 2004, Accessed: Sep. 23, 2022. [Online]. Available: https://www.jstor.org/stable/41064522

[3]   M. Sharma, "School-based interventions for childhood and adolescent obesity," Obesity Reviews, vol. 7, no. 3, pp. 261–269, Aug. 2006, doi: 10.1111/j.1467-789x.2006.00227.x.

[4]   C. Tomlinson, The Differentiated Classroom Responding to the Needs of All Learners, 2nd ed. Alexendria, VA:ASCD, 1999. Accessed: Sep. 23, 2022. [Online]. Available: https://files.ascd.org/staticfiles/ascd/pdf/siteASCD/publications/books/differentiated-classroom2nd-sample-chapters.pdf

[5]   L. McQuarrie, Differentiated Instruction: Provincial Research Review. Edmonton: Alberta Initiative for School Improvement, 2008.

[6]   C. A. Tomlinson, "Teaching for Excellence in Academically Diverse Classrooms," Society, vol. 52, no. 3, pp. 203–209, Apr. 2015, doi: 10.1007/s12115-015-9888-0

[7]   R. S. Bondie, C. Dahnke, and A. Zusho, "How Does Changing 'One-Size-Fits-All' to Differentiated Instruction Affect Teaching?" Review of Research in Education, vol. 43, no. 1, pp. 336–362, Mar. 2019, doi: 10.3102/0091732x18821130.

[8]   C. Tomlinson, Different Learners, Different Lessons, Instruction, vol. 112, no. 2, pp. 21–25, 2002

[9]   C. Tomlinson, Differentiation of Instruction in the Elementary Grades. ERIC Digest, 2000. [Online]. Available: https://files.eric.ed.gov/fulltext/ED443572.pdf

[10] S. Watts-Taffe, B. P. Barbara Laster, L. Broach, B. Marinak, C. McDonald Connor, and D. Walker-Dalhouse, "Differentiated instruction: Making Informed Teacher Decisions," The Reading Teacher, vol. 66, no. 4, pp. 303–314, Nov. 2012, doi: 10.1002/trtr.01126.

_____

[11] R. Felder and B. Soloman, "Learning styles and strategies," Teaching and Learning STEM. Available: https://www.engr.ncsu.edu/wp-content/uploads/drive/1WPAfj3j5o5OuJMiHorJ-lv6fON1C8kCN/styles.pdf (Accessed: Sep. 23, 2022)

[12] M. H. Bornstein and H. Gardner, "Frames of Mind: The Theory of Multiple Intelligences," Journal of Aesthetic Education, vol. 20, no. 2, p. 120, 1986, doi: 10.2307/3332707.

[13] L. S. Vygotsky, Mind in Society: The Development of Higher Psychological Processes. Cambridge: Harvard University Press, 1978.

[14] J. Burkett, "Teacher Perception on Differentiated Instruction and its Influence on Instructional Practice," PhD dissertation, University of Central Oklahoma, 1994. [Online]. Available: https://core.ac.uk/download/pdf/215277469.pdf

[15] J. L. C. Maeng, "Differentiating Science Instruction: Success Stories of High School Science Teachers," PhD dissertation, University of Virginia, 2011.

[16] C. Tieso, "The Effects of Grouping Practices and Curricular Adjustments on Achievement," Journal for the Education of the Gifted, vol. 29, no. 1, pp. 60–89, Sep. 2005, doi: 10.1177/016235320502900104.

[17] R. Tobin and C. D. Tippett, "Possibilities and Potential Barriers"Learning to Plan for Differentiated Instruction in Elementary Science," International Journal of Science and Mathematics Education, vol. 12, no. 2, pp. 423–443, Apr. 2013, doi: 10.1007/s10763-013-9414-z.

[18] M. Marulanda, P. Giraldo, and L. Lopez, "Differentiated instruction for bilingual learners." Annual Conference of the Association for Supervision and Curriculum Development, 2006

[19] A. Dooley, "The effects of differentiated instruction on a fourth grade science class," MA dissertation, Ohio University, 2009

[20] B. C. Swaffield, and I. Guske, Global encounters: pedagogical paradigms and educational practices, Newcastle upon Tyne, NE: Cambridge Scholars Publishing, 2011, Accessed: Sep. 23, 2022. [Online]. Available: https://www.cambridgescholars.com/resources/pdfs/978-1-4438-2955-7-sample.pdf

[21] I. S. I. Magableh and A. Abdullah, "On the Effectiveness of Differentiated Instruction in the Enhancement of Jordanian Students' Overall Achievement," International Journal of Instruction, vol. 13, no. 2, pp. 533–548, Apr. 2020, doi: 10.29333/iji.2020.13237a.

[22] L. P. Affholder, "Differentiated Instruction in Inclusive Elementary Classrooms," Semantic Scholar, 2004. Accessed: Sep. 23, 2022. [Online]. Available: https://www.semanticscholar.org/paper/Differentiated-instruction-in-inclusive-elementary-Affholder/986f40d8ee57b6eca51f8ecf763292e5b7a51fbe

[23] S. McAdamis, "Teachers Tailor their Instruction to Meet a Variety of Student Needs," Journal of Staff Development, vol. 22, no. 2, pp. 1–5, 2001.

[24] H. R. Ernst and T. L. Ernst, "The Promise and Pitfalls of Differentiated Instruction for Undergraduate Political Science Courses: Student and Instructor Impressions of an Unconventional Teaching Strategy," Journal of Political Science Education, vol. 1, no. 1, pp. 39–59, Feb. 2005, doi: 10.1080/15512160590907513.

[25] S. G. Paris and A. H. Paris, "Classroom Applications of Research on Self-Regulated Learning," Educational Psychologist, vol. 36, no. 2, pp. 89–101, Jun. 2001, doi: 10.1207/s15326985ep3602_4.

[26] M. Pressley and P. B. El-Dinary, "What We Know About Translating Comprehension-Strategies Instruction Research Into Practice," Journal of Learning Disabilities, vol. 30, no. 5, pp. 486–488, Sep. 1997, doi: 10.1177/002221949703000504.

[27] TrackTest, "Test-retest reliability study," TrackTest English. Accessed: Sep. 23, 2022. [Online]. Available: https://tracktest.eu/test-retest-reliability-study/

_____

[28] N. Entwistle, V. McCune, and H. Tait, "Approaches to learning and studying inventory (ASSIST)," ResearchGate, 2013,
https://www.researchgate.net/publication/50390092_Approaches_to_learning_and_studying_inventory_ASSIST_3rd_edition

[29] W. McCarty, S. Crow, G. Mims, D. Potthoff, and J. Harvey, "College Classroom," Journal of Curriculum, Teaching, Learning and Leadership in Education, vol. 1, 2016. Accessed: Sep. 23, 2022. [Online]. Available: https://digitalcommons.unomaha.edu/cgi/viewcontent.cgi?article=1005&context=ctlle

[30] W. Turner, O. Solis, and D. Kincade, "Differentiating Instruction for Large Classes in Higher Education," International Journal of Teaching, vol. 29, no. 3, pp. 490–500, 2017. Accessed: Sep. 23, 2022. [Online]. Available: https://files.eric.ed.gov/fulltext/EJ1151047.pdf