

**Professional Development Programme on the
“New Senior Secondary Learning & Teaching Strategies for Information and
Communication Technology (ICT) - (1) Catering for Learner's Diversity”
(Course ID: CDI020061594)
Assignment Summary Report**

1. Background

The EMB commissioned the Department of Mathematics, Science, Social Sciences and Technology of The Hong Kong Institute of Education to conduct the captioned course in December 2006, with the aim to introduce learning & teaching strategies on catering for learner's diversity to ICT teachers. A total of 310 teachers attended the course. Among them, 308 have completed and returned the assignment with a response rate over 99%.

2. Analysis and Findings of the Assignments

During the course, each participant was required to submit an assignment which included four questions as a part of the programme requirement (Appendix 1 refers).

Question (1)

Q1 asked participants to make suggestion on a topic/sub-topic of the ICT curriculum that requires the use of multimedia learning principle to design effective instructional material for catering individual learning differences.

The top four suggested topics of the ICT curriculum were as follows which accounted for over 80% of all suggestions:

Topic	Vote (%)	Subtopic / learning element suggested by participants
Internet and its application	30	The networking and internet basics
Computer system fundamentals	27	Basic machine organisation Computer systems
Data communications and networking basics	14	TCP/IP
Social implications	12	Public and private keys encryption system

Appendix 2 listed the reasons given by participants for suggesting these learning elements that require the use of multimedia learning principle to design effective instructional material for catering individual learning differences. In general, participants opined that these learning elements involve abstract concepts/definitions, which are difficult to explain in just text or verbal expression, but the teaching effectiveness could be dramatically improved with

the appropriate use of multimedia resources, especially to advanced students and low-achievers.

Teachers who did not have an opportunity to join the captioned course may do a self-reflection on their individual teaching practices and classroom situations, taking into consideration the views of the teacher participants in applying the multimedia principles when designing instructions and teaching resources. The example on public and private keys encryption system in the handouts is also valuable for teacher's reference.

Question (2)

Q2 requested participants to elaborate their strategies for pacing the teaching of the concepts of data redundancy and the methods used to reduce data redundancy for catering individual learning differences.

Various strategies/activities making use of spreadsheet software in catering for learner's diversity have been suggested by the participants. Teachers may make reference to these strategies/activities in Appendix 3 when designing their owns. Based on the written responses collected from the assignments, participants showed a very positive attitude towards the innovative use of spreadsheet in teaching the method of reducing data redundancy as introduced in the course.

While spreadsheet was mainly introduced as a learning tool for average students during the course, it may be worth for teachers to further explore the feasibility of modifying the design of the spreadsheet so that students of various levels (advanced students and low-achievers) can also benefit from this learning activity.

Question (3)

Q3 requested participants to suggest the grouping strategies that they would adopt in ICT lessons, and elaborate on their possibility of facilitating cooperative learning and catering individual learning differences.

Participants indicated special interest on the following two grouping strategies which altogether accounted for over 50% of the responses. They are "Grouping learners with different learning abilities together" (31%), "Grouping learners with various expertise together" (23%). Reasons behind their choices in details can be found in Appendix 4. In general, participants opined that for the strategy of "Grouping learners with different learning abilities together", while low-achievers could benefit from the peer-tutoring by advanced learners, the latter themselves could also synthesize and consolidate their own knowledge during the tutorial, thus creating a win-win outcome. Furthermore, learners of different

expertises could also learn from others during the process of cooperative learning.

While participants showed in their responses that they had a quite comprehensive understanding of the benefits of the two grouping strategies, they may be also aware that simply putting students together does not guarantee learning will happen. In fact, implementing these strategies effectively in a classroom is by no means an easy task. Teachers themselves should understand the basic principles/concepts of cooperative learning including team rewards, individual accountability, equal opportunities, etc. They may also need to ask themselves couples of questions before deciding which grouping strategy to opt for. These questions may include but not limited to:

- 1) What are the learning styles of my students? Which strategies could best meet their needs?*
- 2) Does the topic/subtopic I am going to teach prompt the use of a particular strategy?*
- 3) What is the optimal group size of a particular strategy in order to make cooperative learning effective?*

Teachers may make reference to the section “Effective strategies to cater for learner’s diversity: Grouping Strategies” and also the suggested readings in the handout for insights into these issues.

Question (4)

Q4 requested participants to suggest a topic/sub-topic of the ICT curriculum for the following 5 assessment modes which might improve the teaching of ICT for catering learner's diversity, and then elaborate on their suggestions.

Paper and Pencil Assessment

The following three topics of the ICT curriculum are mostly suggested by participants for paper and pencil assessment, which in total accounted for 60% of the suggestions. Teachers revealed in their assignment that they would adopt written assessment for those factual knowledge oriented subtopics. Teacher’s reasons in details for selecting these topics can be found in Appendix 5A.

Topic	Vote (%)	Subtopic / learning element suggested by participants
Computer System Fundamentals	27	Basic machine organization Computer system
Information Processing	20	Data Organization and data control Data representation
Social Implications	13	Intellectual property

While the subtopic “Intellectual property” was regarded by some participants as appropriate to be evaluated by written test, are there any other better ways to assess learners? A comprehensive assessment of student’s learning of the topic itself actually involves evaluating student’s attainment in the learning target on values and attitudes. To evaluate learner’s values and attitudes effectively, different assessment methods as suggested in Chapter 5 of the Information and Communication Technology Curriculum and Assessment Guide should be employed, instead of solely relying on written assessment. These methods include student’s self-reflection, teacher’s observations, oral questioning, etc. It is worth to point out here that positive values and attitudes are conducive to improvement in students’ performance, which can be observed through formative assessment and the end product of the learning activity.

Performance-based Assessment

The following three topics of the ICT curriculum were typically suggested by participants for performance-based assessment, which in total accounted for over 75% of the suggestions. Participants revealed that the learning of these subtopics involves the acquisition of many practical skills and in some cases production of product, which should be best evaluated by performance-based assessment. Teacher’s reasons in details for selecting these topics can be found in Appendix 5B.

Topic	Vote (%)	Subtopic / learning element suggested by participants
Internet and its Applications	32	Elementary Web Authoring
Multimedia Production and Web site Development	29	Multimedia Production
Basic Programming Concepts	14	Programming

While performance-based assessment may be generally considered by participants as an effective mode for evaluating student’s practical skills and products, would a combination of several assessment modes achieve more? For example, what about using the result from peer assessment to supplement those from performance-based assessment for a more objective evaluation of learning outcomes? The optimal use of mixed assessment modes in practice is an area that worth to be further explored by teachers.

Oral Assessment

The following three topics of the ICT curriculum were typically suggested by participants for oral assessment, which in total accounted for over 60% of the suggestions: “Social Implication” (29%), “Internet and its Applications” (19%), “Multimedia Production and Web

site Development” (13%). Nearly one-third of all respondents considered oral assessment as an ideal assessment mode for the topic “Social Implication”. Since the topic involves massive discussion on economic, legal, social, ethical and security issues which are controversial in nature, open-ended verbal questions could help elicit learner’s personal views. Teacher’s reasons in details for selecting these topics can be found in Appendix 5C.

It seems that teachers have special preference on using oral assessment in several topics. Oral assessment, like oral questioning and verbal quiz, allows teachers to better cater for learner differences through directly observing individual learner’s responses and giving instant feedback. Teachers are encouraged to use it regularly in lessons for all topics, but not confining the use of it to certain topics/sub-topics of the curriculum.

Self Assessment

The following three topics of the ICT curriculum are typically suggested by participants for self assessment, which in total accounted for over 60% of the suggestions: “Internet and its Applications” (28%), “Multimedia Production and Web site Development” (24%), “Social Implication” (16%). Teacher’s reasons in details for selecting these topics can be found in Appendix 5D. In general, participants believed that through self-reflection on what they have achieved in their learning and how far, individual learners could give valuable feedbacks regarding their learning progression to teachers, who could then modify the teaching pace and instruction materials accordingly to meet individual learner’s need.

Resembling to the case of oral assessment, while teachers may have special preference on using self assessment in several topics, teachers are encouraged to use it regularly in lessons for all topics.

Peer Assessment

The following three topics of the ICT curriculum are typically suggested by participants for peer assessment, which in total accounted for over 80% of the suggestions: “Internet and its Applications” (46%), “Multimedia Production and Web site Development” (26%), “Information Processing” (10%). Teacher’s reasons in details for selecting these topics can be found in Appendix 5E. Assessment on these topics/subtopics often generates a final product in common. Teachers believed that student’s works in form of web pages and multimedia products were appropriate to be assessed by their peers who could act as the audiences. Peer Assessment could help create a collaborative learning environment for learners to comment on each other’s works. Learners could develop their critical thinking through sharing and considering different views and perspectives from others.

To further enhance the reliability of the evaluation, teachers may consider adopting the method of triangulation, i.e. to decide the final grading of a product, ratings from teacher, peer and the student himself should be considered as a whole.

To sum, in general the written responses collected from the assignments indicated that participants were professional in making decisions on selecting appropriate assessment modes for different topics/sub-topics in the ICT curriculum. Teachers may also find it useful to make reference to the various modes and examples suggested in the section “Effective strategies to cater for learner’s diversity: Assessment” of the handouts when preparing assessment.

3. Example on Catering for Learner's Diversity in ICT Lessons

Various strategies with examples on catering for learner's diversity were included in the course handout, which can be downloaded from the following web page: <http://www.emb.gov.hk/index.aspx?nodeID=3372&langno=1>. A practical example on how to make use of these strategies in a specific ICT topic "Databases" is provided below for teacher's reference.

Elective Part

Option: A Databases

Topic: c Introduction to Database Design Methodology

Theme: Understanding the concepts of data redundancy and methods to reduce data redundancy

When introducing the concepts of data redundancy to students, teachers can *modify the styles of instruction by pacing learning and teaching according to the abilities of learners*:

Gifted students: Discussing relations with examples in the form of Entity-Relationship (ER) diagrams

Average students: Discussing relations with examples in the form of tables that contain concrete data

Low-achievers: Discussing relations with MORE examples in the form of tables that contain concrete data

When introducing the methods to reduce data redundancy to students, teachers can *adapt instructional materials by making use of a variety of resources instead of just using textbooks*. The following instructional materials for learners of different abilities are proposed:

Gifted students: Working with examples of relations on worksheet designed by teachers

Average students: Manipulating tables with concrete data in environment which allow easy exploitation of data tables such as spreadsheets designed by teachers

Low-achievers: Putting students in groups to discuss the concepts and ways to improve it as designed by teachers in a reciprocal tutoring environment

Professional Development Programme
New Senior Secondary Learning & Teaching Strategies for
Information and Communication Technology - Catering for Learner's Diversity
Assignment to be submitted at the end of the course

Name: _____ (Please print) Name in Chinese: _____

School Name: _____

E-service Account: _____ (Please print clearly)

Instructions:

1. There are **FOUR** questions in these TWO pages. Participants are requested to answer **ALL** questions.
2. Please write **ONLY in the spaces provided**.
1. Participants are requested to make suggestion on a **topic/sub-topic of the ICT** curriculum that requires the use of **multimedia learning principle** to design effective instructional material for catering individual learning differences. Please **elaborate briefly**.

Answer

2. The following items are required to be taught in “Introduction to Database Design” in the “Databases” elective in the NSS ICT curriculum:
 - a. analyse examples on simple Entity-Relationship (ER) diagrams
 - b. discuss the concepts of data redundancy and the methods used to reduce it
 - c. introduce definitions on normal forms
 - d. transform the ER diagrams to tables in relational databases

Participants are requested to **elaborate briefly their strategies for pacing** the teaching of the concepts of data redundancy and the methods used to reduce data redundancy for catering individual learning differences. Elaboration can either focus on the item of data redundancy or intertwined the item of data redundancy with other listed items.

Answer

3. Participants are required to suggest their **grouping strategies** with **elaboration** on their **beliefs** on the possibility of facilitating cooperative learning and catering individual learning differences.

Answer

4. The following assessment modes are discussed in the course:

1. Paper and Pencil Assessment,
2. Performance-based Assessment,
3. Oral Assessment,
4. Self Assessment,
5. Peer Assessment.

Participants are requested to **suggest a topic/sub-topic** of the ICT curriculum **for each of the five modes of assessment** which might improve the teaching of ICT for catering learner's diversity. Please **elaborate ONE of your suggestions**.

Answer

The general reasons of participants for suggesting “The Networking and Internet Basics” as the topic/subtopic that requires the use of multimedia learning principle to design effective instructional material for catering individual learning differences

The Compulsory Part C. Internet and its Applications a. The Networking and Internet Basics

- 1 「在教建網及互聯網基本知識時，可採用[多媒體學習原理，因為]男學生對這方面的興趣濃厚，基礎較好，即使不用多媒體方式亦可明白，但女學生在這方面的知識明顯不足，如果用純文字教學，她們會有極大困難。所以我會用多媒體方式來照顧差異。」

- 2 「建議題目：建網及互聯網基本知識：這部份內容有較多的名詞和定義解釋，學習能力低[的]學生[可]多用圖解，而已有基本知識者可利用文字作深入解說。」

- 3 「課題/子題：互聯網及其應用/建網：此課題抽象，運用多元表徵原理，運用文字和圖片、動畫可幫助能力差異的學生，有些人可以[以]文字學習，而有些則以動畫學習則較有效率。上課時再利用分散注意力原理以照顧學生的學習差異。」

- 4 「課題：互聯網及其應用，子題：建網及互聯網基本知識：如使用多媒體學習[原理]，學生可利用眼、耳、字、圖和聲學習，這可配合不同智能的學生，如 Howard Gardner 1983 說各人有不同的多元智能，如運用多媒體教學，正好配合各學生有不同的長處。」

- 5 「建網及互聯網基本知識：除了文字及圖片外，可運用動畫介紹如何接駁網絡，再加上聲音旁述，可有效地讓同學得到相關資訊，對學習能力較低的同學，可暫停或重播動畫。」

- 6 「建網及互聯網基本知識：因為在建網的一節內，同學要認識網絡的種類及結構，但同學往往都不能分別，所以透過文字+圖像，可加深同學對這方面的記憶，一眼便可知道電腦如何連結。」

The general reasons of participants for suggesting “Basic Machine Organization” as the topic/subtopic that requires the use of multimedia learning principle to design effective instructional material for catering individual learning differences

The Compulsory Part B. Computer System Fundamentals a. Basic Machine Organization

- 1 「可以在教授基本機器組織之課題加入圖片及文字的版本，以認識電腦硬件之外貌，並掌握硬體運作之流程，能力較佳的學生可透過文字及超連結學得更多，能力弱的可用圖表了解硬件組織結構及流程。」

- 2 「電腦系統基礎-基本機器組織」“Some students are very strong in reading text but some students are very strong in reading pictures. So providing the pictures of different hardware components of a computer system can help those students who are weak in reading text to understand better of the subject content.”

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- 3 「電腦系統基礎—基本機器組織闡釋：可以將圖及文字互相配合，吸引不同類型的學生去注意及思考，另外亦可配上不同顏色的連線讓學生明白不同基本機器之間的關連。」

 - 4 「基本機器組織：使用多媒體教授基本機器組織可把抽象的內容用圖像表達，讓學生容易掌握及理解。」

 - 5 「建議課題: CPU Execution Cycle (i.e. Machine Cycle)，由於 Machine cycle 包括有 CPU 及 Memory 之間的資料及指令流動，對於沒有程式設計基礎的同學較難理解。運用動畫圖像，能有效地展示有關流程。對程度較弱[的]同學，可學習簡單 sequence structure 的執行，對程度較高[的]同學，可學習較深的 selection 的執行。」
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The general reasons of participants for suggesting “Computer Systems” as the topic/subtopic that requires the use of multimedia learning principle to design effective instructional material for catering individual learning differences

The Compulsory Part B. Computer System Fundamentals c. Computer systems

- 1 “B. c. Computer System
Use multi-media presentation (especially animation) to show the operation of the CPU, main memory and main registers so that students can have a full picture as they are ‘untouchable’ parts in a computer system.”

 - 2 「電腦系統這個單元很需要使用多媒體學習原理，因為電腦設備日新月異，越出越多，要是只用文字交代，學生就這個硬件設備也未曾見過，實難以理解。本人甚致把砌機過程拍攝下，特別讓一些同學未接觸過砌機的同學更了解各部份設備的關係。」

 - 3 「電腦系統基礎：基本機器組織、系統軟件、電腦系統等，以上所有課題全適合，特別是電腦系統，我曾試教時不用圖像，同學完全不能接受，只有一些對電腦已非常認識的同學覺得明白，用多媒體後，明白的人多了很多。」

 - 4 「我認為『電腦系統』這課題需運用多媒體學習原理，因為圖樣可以清楚顯示各部件之間的關係，比文字描述更易明白和記憶。」

 - 5 「電腦系統：利用多媒體演示如圖片、影像等，同學可透過圖片，更加清楚內容。」
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The general reasons of participants for suggesting “Data Communications and Networking Basics” as the topic/subtopic that requires the use of multimedia learning principle to design effective instructional material for catering individual learning differences

The Elective Part B. Data Communications and Networking a. Data Communications and Networking Basics

- 1 「在這子題中，有一些基本知識如介紹 TCP/IP 等，學生若只用課本[中的]文字認識這課題，差異較大的學生就會難以理解；若運用圖片和例子如交通網絡等來解釋這課題，學生較易明白和理解，而學生更易於記憶。所以我建議這子題
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使用多媒體學習原理設計教材。」

- 2 「學習差異帶來的問題：對一些能力稍遜和對文字理解力較低的同學，TCP/IP 為其中一個難於理解的課題。

策略一：運用『多元表徵原理』，結合文字及圖像於演示教材中。

策略二：運用『鄰接性效應』，把文字和相關圖像放在一起。

策略三：運用『分散注意力效應』，課堂上著重用聲效及圖像，課後教材著重文字及圖像。」

- 3 「TCP/IP 通訊協定，因內容抽象，須利用原理加強和協助想像力較低的學生產生記憶影像，將內容形象化，甚至生活化。」
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- 4 「在解釋 TCP/IP 的原理時，可加強利用圖片及動畫讓同學清楚 TCP/IP 各自的作用及封包在互聯網傳送時的過程。」
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- 5 「數據通訊及建網基礎：同學可以在簡單的圖像中理解網絡的基本結構，老師亦可從圖及文字解釋基本網絡要求。

同學可以[利用]一些不同的圖像思考各網絡的優點及缺點。」

The general reasons of participants for suggesting “Threats and Security on the Internet” as the topic/subtopic that requires the use of multimedia learning principle to design effective instructional material for catering individual learning differences

The Elective Part E. Social Implication d. Threats and Security on the Internet

- 1 「公開密碼匙的運用原理，由於此原理較抽象，且學生較少接觸，若單以文本說明，同學們不容易理解，所以應使用多媒體協助，例如可以圖文的簡報作簡介，繼而用視訊(IT 檔案) 作示範，讓學生更易吸收，甚至可以下載免費軟件讓能力較高的同學嘗試，加深其認識。」
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- 2 「資訊及通訊科技對社會的影響—網上威脅及保安，有些學生喜歡見圖片以了解內容，一些學生則能用文字吸收知識，所[以]圖片加文字的教學可同時照顧這類學生差異。」
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- 3 「資訊及通訊科技對社會的影響—網上威脅及保安，因為大部份同學已知電腦病毒的存在及能破壞自己的電腦，利用圖和文字加上實例迎合學習有差異的同學學習，課後，不同能力可選擇不同難度的功課。」
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- 4 「網上威脅及保安：公開密碼學及公共基建，以文字及圖像方式照顧不同學習模式，更具彈性，可利用 wikipedia 網站的資料及以即時活動配合作事前及事後評估。」
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- 5 「建議用必修部分中資訊及通訊科技對社會的影響的網上威脅及保安，因為這個子所談的內容比較生活化，例如政府在電視上用廣告來解釋給市民，所以可以 ETV、報紙的內容、電影的片段作為課文的導入令學生對課文的認知增加。」
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The strategies of participants for pacing the teaching of the concepts of data redundancy and the methods used to reduce data redundancy (or intertwined the item of data redundancy with other items of “Introduction to Database Design”)

Intertwined the item of data redundancy with other listed items

- 1 「先利用 Excel 及簡單的例子引入 1NF 的定義，指出何為冗餘度及其缺點。由學生以 Excel 形式嘗試將一個 table 分析為兩個或以上的 sub-table 以降低冗餘度。引入 ER Diagram 的基本概念來系統化地分析數據。介紹各 NF 的定義及好處，以不同例子解釋各 NF 的關係。對程度較低的學生必須輔以大量實際例子，對程度較高的學生，可以用一些校內使用的學生資料表，由他們以小組形式合作討論如何建構對應的 database 以達至 3NF。」
- 2 「學習能力高的學生自然可用多種的教學進度和策略以資料表輔助規格化可以引入 ER 圖。學習能力一般的學生就要多花時間用例子及 Excel 代替 table 使學生明瞭其原理。能力稍遜的學生可能要給予同一套數據[及]給予兩個空白表格讓他們把數據填入做『引子』，再輔以其他例子作起步。」
- 3 「不錯，江先生提到的用 Excel 給學生一個處境，讓學生可以將 “Database table” 的 data 搬來搬去，先個別做，再分組互教，由老師安排每組也可有能力較高的學生，最後再由最好的一組在班前作演示。再利用不同的例題由淺入深，課堂的活動是[能力低]的學生也能完成及處理的！這個教育 Data Redundancy 的方法相當不錯，對於能力較高的學生，可在一、兩個例子後便引用 ER Diagram，但對於能力不高的學生，便需要更多的例子，而起初也只可要求學生制作只是一部分的 ER Diagram。」

Focus on the item of the concepts of data redundancy

- 1 「策略一：將教材設計成多階段進行，由淺至深，讓能力稍遜的同學可先從一些簡單的數據例子，發展對數據冗餘度的概念；能力較高的學生可以隨時挑戰下一階段的題目。
策略二：運用學生已知和熟識的知識或技巧，例如：試算表，從操作數據的過程，理解數據冗餘度的概念。
策略三：互教，鼓勵能力較高的學生向能力稍遜的學生進行指導，藉此將學生的進度拉近。」
- 2 “Using Excel to teach Data Redundancy is not a bad idea. In fact, example should be given to students and encourage them to reconstruct the table by using Excel. Of course, different levels of difficulties in the example should be taken in consideration for different level of students.”
- 3 「利用 Excel 軟件，展示一個包含數據冗餘的例子，指出數據冗餘的問題，並示範一個減低數據冗餘的方法，讓學生自行嘗試解決相類似的問題，並向同學分享其解決方法，利用數個不同例子(漸漸增加挑戰性)，讓學生多嘗試。」
- 4 「我覺得由 Date Redundancy 作為開始可令同學更容易明白，因為同學對 table

接觸比較多，當看到 table 的時候容易明白。用 Excel 是一個很好的方法，我也會使用，因同學可操作電腦，不會太悶，而且很容易看到資料重複，容易理解 Data Redundancy，我自己教的時候我會要學生更改資料，學生會[自]發學[習] Data Redundancy 的壞處及甚麼要 normalize。」

The general suggestions made by the participants on their grouping strategies and their beliefs on facilitating cooperative learning and catering individual learning differences

Grouping learners with different learning abilities together

- 1 「我會把擁有不同學術能力的學生分一組。能力強的學習者可以[利用]自己已有知識幫助能力稍遜的學生。對於前者，他可以組織及鞏固自己已學的知識，從而指導能力稍遜的學習者，然後後者可透過詢問自己不能掌握的課題。」
- 2 「編組時分配成績有高、中、低的[學生]，讓成績高的同學可以將完成答案給予展示，成績稍遜的[學生]，可以參照及學習朋輩的成果，另一方面，這可以拉近學習距離，分散照顧學習差異，各同學便可以有所掌握，有成功感，避免影響課堂進度。」

Grouping learners with various expertise together

- 3 「具不同專門知識成員的編組，如各成員有不同專長，在發揮能力上更加集中，而成員也增加互信，給予鼓勵及表揚他們專長，能加強工作動力。」
- 4 「建設採用『具不同專門知識成員的合作』，以專題研習為例，小組成員各有所長，可互補成員間各人的不足和發揮個人所長而增強滿足感。」

Grouping learners freely

- 5 「首先讓學生自由組合，收集組員名單後，選取較有責任感的學生為組長，再由他去分工。原因：自由組合的小組通常較有互信，溝通較容易。讓有責任感的學生任組長，他可以[督]促其他組員依時、依責任去完成任務。」
- 6 「一定不可多過三人一組。最大重點：盡量自由分組，因[朋]輩的關係能解決很多麻煩，也有很多好處。相熟同學易於溝通，熟識對方特性，又不介意工作量，遇有學習差異時，相熟者亦更樂意於無私的付出以致互相補足。另外，一定要有多個階段的中期檢討(milestone)，以作更多反思及重整。尤其注意要投放更多精神於未自願編好的組別。」

Grouping learners with common interest together

- 7 「組成興趣小組的合作，因為本人深信合作學習必須建議基於愉快的學習過程，如果小組組員有共同興趣的話，他們才能有效地合作學習。」
- 8 「組成興趣小組的合作，這可引發他們的學習動機，有學習動力的他們才能願意主動學習及啟動自己的潛能。」

Grouping thinker and doer together

- 9 「思想型能帶出新念頭，提升組內合作氣氛，與實踐型集中研究可行性互補。」
- 10 「以思考者與實幹者作分組策略，我相信不同人有不同的能力，而透過務實及思考型學生的相互合作，他們能互補不足，於策劃(思考者)及進行(務實者)都能發揮最大效能，讓他們感到自身貢獻。」

A. The general reasons for the suggestions provided by the participants whose suggestions fall on the top ten suggestions of the topics/sub-topics of the ICT curriculum for paper and pencil assessment

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|---|--|
| 1 | 「電腦系統基礎—知識性，透過紙筆，可以評核學生的了解深度。」 |
| 2 | 「紙筆評估：基本機器組織，實作性不強，概念性強。」 |
| 3 | 「為『電腦系統』建議：特定的電腦設定，強化筆試的表達。」 |
| 4 | 「紙筆評估：資訊處理—內容著重事實，背誦適合紙筆評估。」 |
| 5 | 「在『資訊及通訊科技對社會的影響』，引用紙筆評估能評核學生是否能用文字將有關課題的概念和反思表達出來。當中可有助培養學生的表達能力和令老師能具體地評估學生的學習成效。」 |

B. The general reasons for the suggestions provided by the participants whose suggestions fall on the top three suggestions of the topics/sub-topics of the ICT curriculum for performance-based assessment

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|---|--|
| 1 | 「表現為本評估，初級網頁創作：由於課題涉及創作，表現為本評估能更有效地量度學生的能力。」 |
| 2 | 「表現為本：初級網頁創作(技術的測試)」 |
| 3 | 「表現為本：初級網頁創作，以能力及知識評估。」 |
| 4 | 「多媒體製作：使學生自學，自我鼓勵，不適合用文字表達。」 |
| 5 | 「表現為本評估，多媒體製作，因大多屬操作的練習。」 |
| 6 | 「表現為本評估—基本程式編寫概念：此部份學生較需要動手製作並測試結果，才能知道自己是否已掌握。」 |

C. General reasons for the suggestions provided by the participants whose suggestions fall on the top three suggestions of the topics/sub-topics of the ICT curriculum for oral assessment

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| 1 | 「初級網頁創作，可防止抄襲」 |
| 2 | 「資訊及通訊科技對社會的影響—知識產權（可使學生表達自己的意見）」 |
| 3 | 「知識產權及其他社會議題：此課題有關一些價值教育(Value Education)的題目，有時沒有固定答案，讓他們以口頭匯報，可更清楚表達他們的想法，老師和同學亦可即時回應。」 |
| 4 | 「口頭評估—資訊及通訊科技對社會的影響：容易了解學生學習進度，亦可了解同學的批判性思維能力。」 |
| 5 | 「資訊及通訊科技對社會的影響：因大多屬 Open End Question，可口頭讓學生互相討論。」 |
| 6 | 「資訊及通訊科技對社會的影響—每個學生有不同的價值觀。」 |
| 7 | 「口頭評估：多媒體製作，平衡及發展學生的強項。」 |

D. General reasons for the suggestions provided by the participants whose suggestions fall on the top three suggestions of the topics/sub-topics of the ICT curriculum for self assessment

- 1 「多媒體製作：學生可深入了解自己是否明白某些理論。」
- 2 「由於多媒體製作，紙筆評估或口頭評估均困難，但同學可自評，表達自己那方面強或弱。而就其堂上習作表現，老師可以正確掌握同學差異，並可安排不同程度同學，互相指導和學習，分組完成某特定題目。」
- 3 「初級網頁創作：同學可透過自我評估，了解是否已掌握所須的知識及技巧。」
- 4 「自我評估：可讓參與者能檢視自己的學習過程(網頁創作)，從中作出反思及提出改善或完備建議，為學習作出改進。課題：互聯網及其應用，子題：初級網頁創作」
- 5 「知識產權（有效協助學生自我反省）」
- 6 「辦公室自動化軟件的運作：自我評估，讓老師更容易知道學生所學的進度和程度，從而讓老師更能調整教學進度。」自我評估
- 7 「由學生自評對辦公室自動化軟件的運作，可更容易掌握學生共同不足之處。可採用分組或個別形式替不同程度的學生作出教授，因這方面學生的差異可能很大。」

E. The general reasons for the suggestions provided by the participants whose suggestions fall on the top three suggestions of the topics/sub-topics of the ICT curriculum for peer assessment

- 1 「初級網頁創作：同學背景、興趣、能力各有不同，在互評中同學更清楚要求，經思考給予評分，自己得益。」
- 2 「同儕互評—初級網頁創作：經同學的互相觀摩可以互補長短，互相學習，明白 team work 的重要。」
- 3 「同儕：多媒體製作—這可讓學生分辨及深思該課題的重點，並訓練批評性思考，同時令其自我反[省]自己的作品的可改善處。」
- 4 「網站建構，學生會更投入及防止抄襲。」
- 5 「在網站建構上可利用同儕互評，讓各組同學意見互相分享，互相學習，讓同學的意見得到表達。」
- 6 「同儕互評—資訊演示：可培養學生的批判能力。」
- 7 「資訊演示—同學互相評估同學的演示技巧，透過互相提醒，促進不同學習能力的[學生]學習。」