Using Collaborative Teaching and Inquiry-Based Learning to Help Elementary School Students Develop Information Literacy and Information Technology Skills

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Background

☐ Research found

☐ IBL improved students' independent learning capabilities, developed their generic skills and interpersonal relationships.

☐ IBL enabled students to combine knowledge, skills, values, and attitudes to construct knowledge through a variety of learning experiences (Hong Kong Education Bureau).

☐ School librarians and teachers worked together effectively in guiding students' inquiry learning(Kuhlthau et al, 2007).

☐ Collaborative teaching approach combined with inquiry PBL improved students' IL and IT skills in Hong Kong(Chu, 2008).

Background

☐ Schools should refine their teaching approaches and assessment methods to incorporate the 21st-century competencies into the academic curriculum.

☐ Many students in Taiwan had only limited access to pertinent databases for primary level research and were not well-trained with IL skills.

Methods

☐ Case study

☐ 23 sixth-grade students in six groups with some previous inquiry experiences and 3 Teachers.

☐ The project lasted for 18 weeks, total 54 class sessions, 40 minutes each.

Instructional Content

Context:
the "multicultural" unit from the sixth-grade Social Studies textbook.

Methodology:
integrating IL and IT skill training into an inquiry-based curriculum

Instructors involved:

- Teacher Librarian
- Social Studies teacher
- Computer teacher

Evaluation

Task Definition

Information Seeking Strategy

Big6

Synthesis

Use of Information

Location & Access

(Eisenberg & Berkowitz, 2000)

Big6-1 定義問題

一、 請在小組討論後，寫下你們這組共同想研究的主題。

_____

二、 發展問題利用 5W1H（Who、What、When、Where、Which、Why、and How）
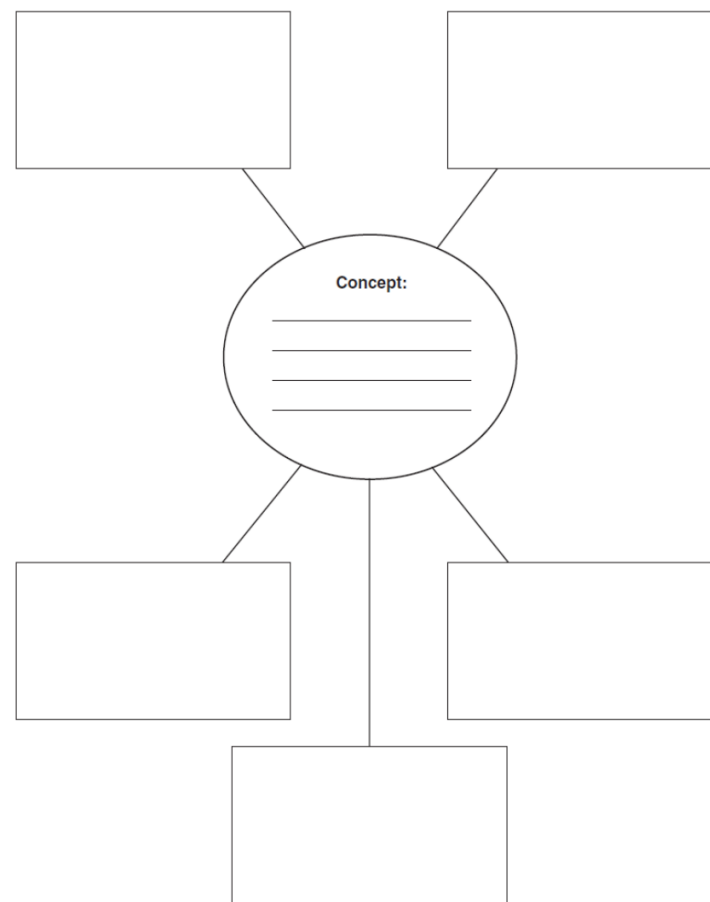
1. _____

2. _____

3. _____

三、完成 K-W 圖表，此圖表可以幫助你辨認所需要的資訊

K 這個主題我知道什麼？	W 這個主題，我想發現什麼？

四、我會用什麼形式表達我的成品?

簡報	
剪貼簿	
小論文	
多媒體影片	
其他	

Concept Map

Concept: _____

Big6-2 尋找策略　**Information Seeking Strategy**

一、可能的資源表

□ 非小說書籍	線上資源/資料庫
參考工具書	□
□ 地圖	□
□ 百科全書	□
□ 字辭典	□
□ 年鑑	□ 其他
□ 期刊	
□ 報紙	□ 網頁
其他	□ 訪談
□	□ 影音
□	
□	
□	

Big6-3 取得資訊　**Location & Access**

一、請列出剛開始的搜尋詞彙

二、研究過程中的搜尋詞彙

三、我從哪裡發現這些資源

□ 學校圖書館　　□ 公共圖書館　　□ 大學圖書館
□ 課本　　　□ 網路　□ 其他——————————————

四、誰幫你們找到這些資源？

□ 我們自己　　　□ 圖書館員　　　□ 教師
□ 父母　　　　□ 其他——————————————

五、列出對你的主題最有幫助的資源列表

題名	圖書類號/網址	頁數

六、APA 參考文獻格式

書籍　作者姓名（出版年）。書名。出版地：出版社。
　　　唐土兒（2008）。小仙子和小魔女。高雄：愛智。
期刊　作者姓名（出版年）。篇名。期刊名，出版期號，頁數。
　　　王力行（2012）。快樂讀書會·圖像與文字。未來少年，24，116-117。
報紙
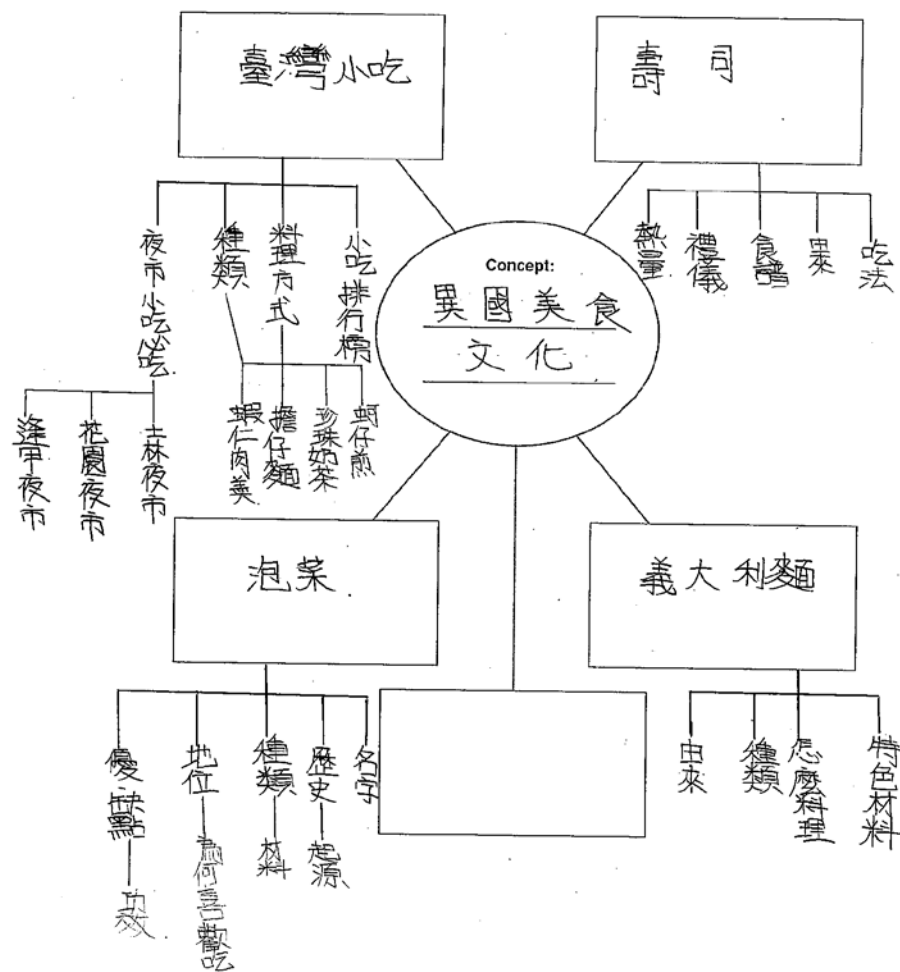
Use of Information

BIG6-4 利用資訊

一、 以心智圖方式列出你的組織架構【小組】

Concept Map

BIG6-6 評鑑 Evaluation

一、自我省思

項目	完全同意	有點同意	有點不同意	完全不同意
1.在我們開始我們的報告之前我們已清楚理解我們的課題		✓		
2.我們有利用最有效的資源	✓			
3.我們所蒐集的資訊都是我們需要用的	✓			
4.我們有作很好的筆記		✓		
5.我們的筆記能讓人理解	✓			
6.我們有正確的記錄我們的參考文獻	✓			
7.我們完成的作品輔合我們原先的期望	✓			
8.我們有效率的利用我們的時間	✓			
9.我們對我們的成品感到驕傲	✓			

二、開放問題

1. 在這次學習歷程中我學到了什麼？

關於研究主題，我學到了 回教許多的習俗、禁忌，也讓 認認了

關於研究方法，我學到了 搜尋關鍵字

2. 在這個學習過程中，我遇到的困難有：

最大的困難是：

上臺報告

其次是：

找書

Instructional Design

- Social Studies teacher
  - Explained the unit content, ("multicultural") and encouraged students to look into related topics.
  - Checked the students' research questions and helped them finish the concept mapping worksheet.
- Teacher Librarian
  - Taught searching skills about online and printed materials, so the students in groups could generate at least three questions for inquiry.
  - Demonstrated how to locate online resources and print out materials available in the school library. The students used their free time to practice searching resources, keywords, webpage address and finished the Big6 worksheet.
- Computer teacher
  - Taught related IT skills such as Xmind, Google skills, Word and PowerPoint editing skills. The students reviewed and evaluated information from all different resources to choose the best answers for their questions.

Lessons designed for teacher collaboration

Week	Social Studies Teacher	Teacher Librarian	Computer Teacher
3		IL pretest	Word / power point pretest
4	1. Concept of multicultural 2. Grouping 3. Choosing group topics	1. Reviewing OPAC searching strategies and skills 2. Assisting group to choose topics	1. Helping individual student set up individual Gmail accounts 2. One group set its own account
5	KWL、5W+1 H	Digital database	
6	Concept map	Web searching strategy	Xmind
7	Located information	Newspaper and periodical searching	UDN (United Daily News) data searching strategy
8	Synthesized teaching	Information evaluation	Word
9		Information ethics	Google Cloud Platform
10		APA style	Google sites
11			PowerPoint
12	Collecting data		
13			Group projects
15	Rehearsal for oral presentation	Rehearsal -for oral presentation	Rehearsal –for oral presentation
16		Editing materials	Editing PowerPoint
17	Oral presentations	Oral presentations	Oral presentations
18		Survey of students' self-evaluation on IBL	
19		IL post test	Word/PowerPoint post test

Public Library OPAC

布袋戲

紀錄類型:	書目-語言資料,印刷品 : 單行本
作者:	謝武彰,
其他作者:	曹俊彥, 1941-
出版地:	臺北市
出版者:	民生報;
出版年:	民83[1994]
版本:	初版
面頁冊數:	34,207面圖 : 21公分;
集叢名:	民生報兒童叢書9
附註:	1994年優良少年兒童讀物
ISBN:	957-08-1146-3

☆ ☆ ☆ ☆ ☆ 讀者評論 0 筆

□ 館藏 　　　　全部

9筆・頁數 1・1

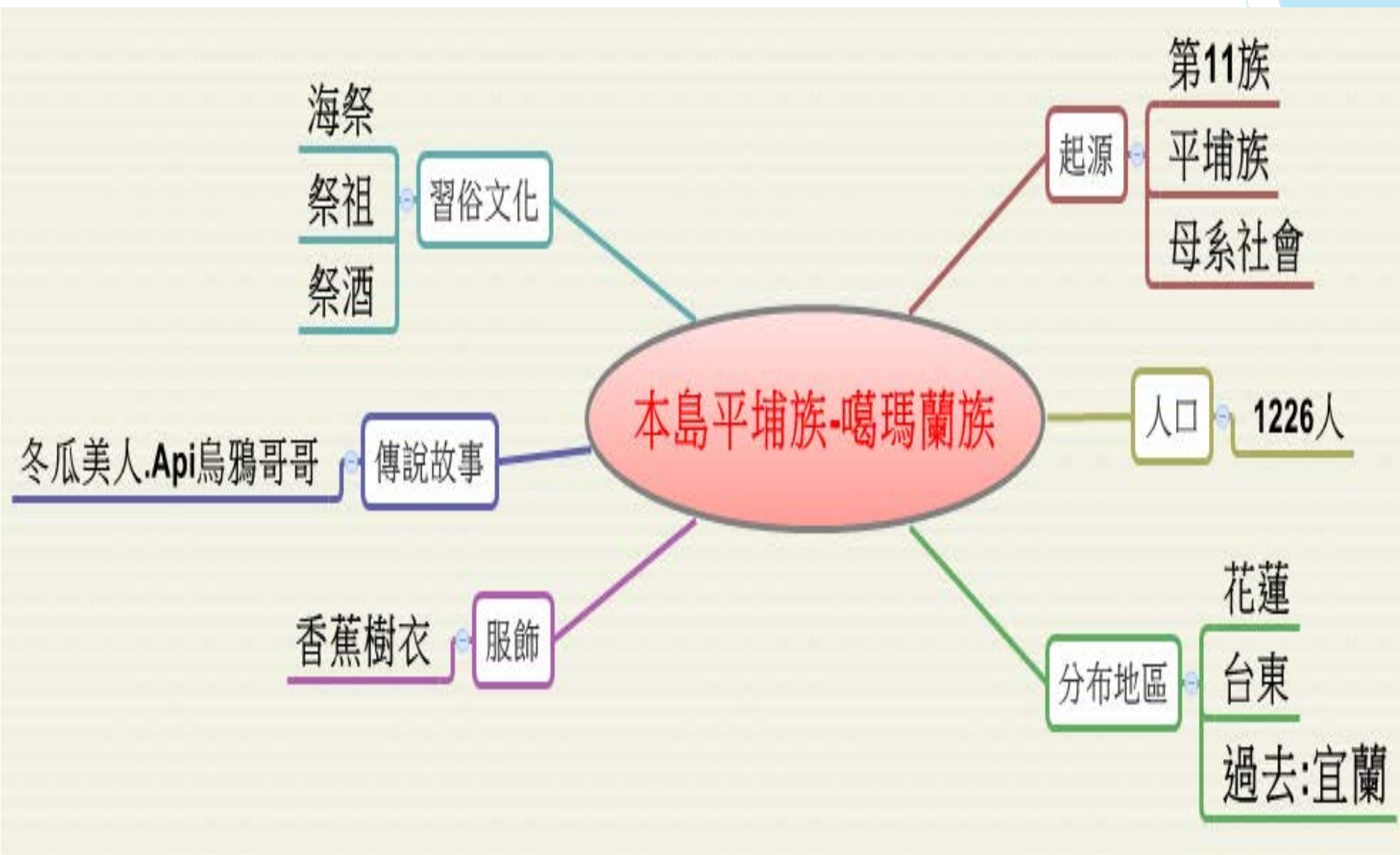| 求書單	條碼號	典藏地名稱	館藏流通類別	資料類型	索書號	使用類型	借閱狀態	預約人數	調閱人數	備註欄	附件	
列印	C017395	中興1樓兒童室	可借30天	中文童書/兒童讀物	J 859.7 0410	一般(Normal)	在架	0	0			
列印	C022164	中興1樓兒童室	可借30天	中文童書/兒童讀物	J 859.7 0410	一般(Normal)	在架	0	0			
列印	TCC0145018	大墩兒童室	可借30天	中文童書/兒童讀物	J 859.7 0410-1 V.9	一般(Normal)	在架	0	0			預約
列印	TCC0145019	大墩兒童室	可借30天	中文童書/兒童讀物	J 859.7 0410-1 V.9	一般(Normal)	在架	0	0			預約
列印	TTW0017717	西屯區2F一般圖書	可借30天	中文書/一般圖書	859.7 0410-1 83	一般(Normal)	在架	0	0			預約
列印	31121000165099	黎明1樓兒童室	可借30天	中文童書/兒童讀物	J 859.7 7247 v.9	一般(Normal)	在架	0	0			
列印	31365000524777	清水兒童室	可借30天	中文童書/兒童讀物	J 859.7 0410	一般(Normal)	在架	0	0	J 78		預約
列印	31368000125025	潭子地下室	可借30天	中文童書/兒童讀物	J 859.7 0410 v.9	一般(Normal)	在架	0	0	B8-14		預約
列印	31374000468415	清水紫雲嚴書庫	可借30天	中文書/一般圖書	859.7 0410	一般(Normal)	在架	0	0	J-221		預約

Newspaper database

Google Drive

Group Xmind

Individual Xmind
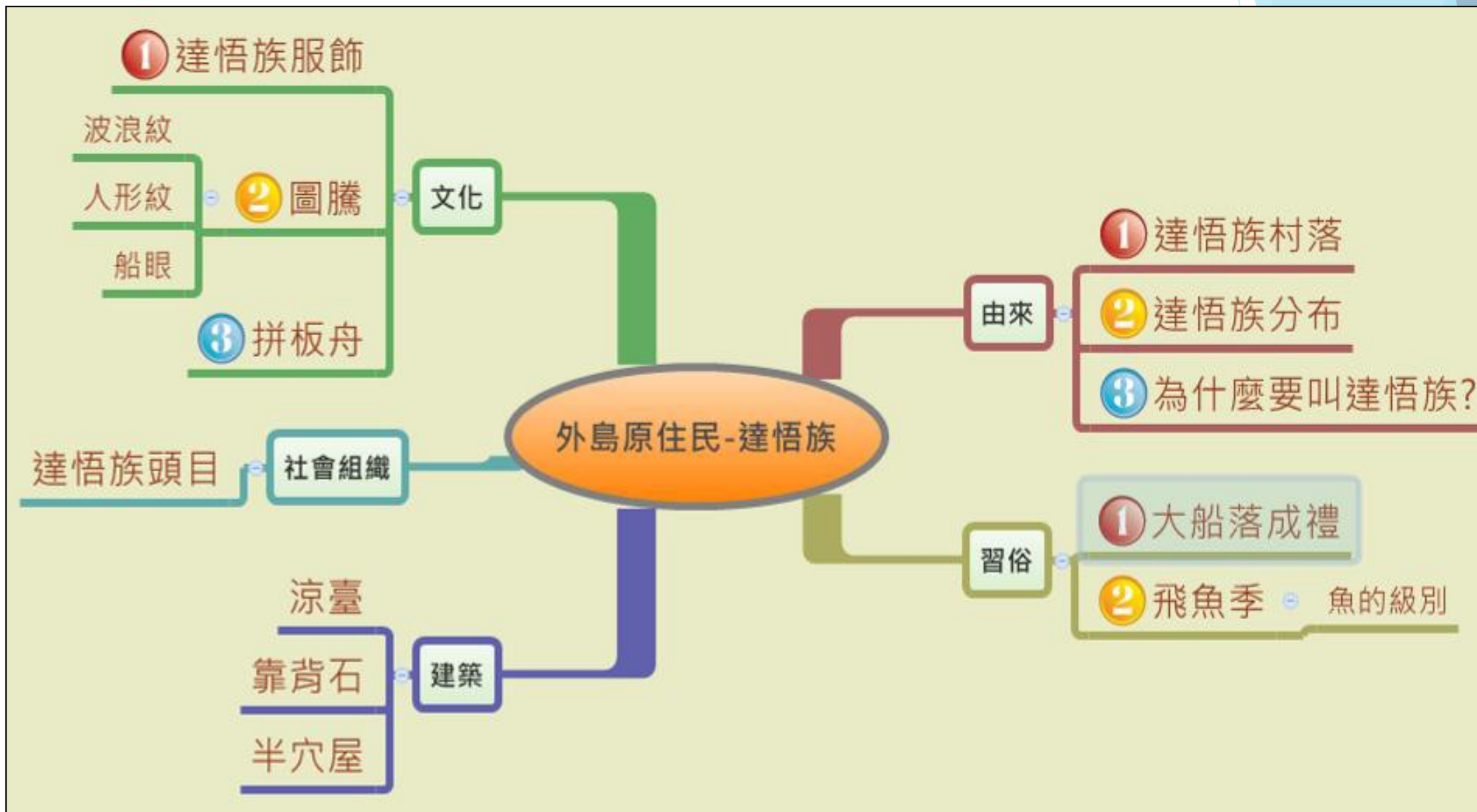
個人心智圖

陳宣諭：
噶瑪蘭族

個人心智圖

林嘉緯：
賽德克族

特色 — 紋面文化

人口 — 八千至一萬人

塞德克族

分布 — 台灣本島中部、東部及宜蘭山區。

風雲人物 — 莫那·魯道

習俗 — 祭典 — 播種祭 / 祈雨祭
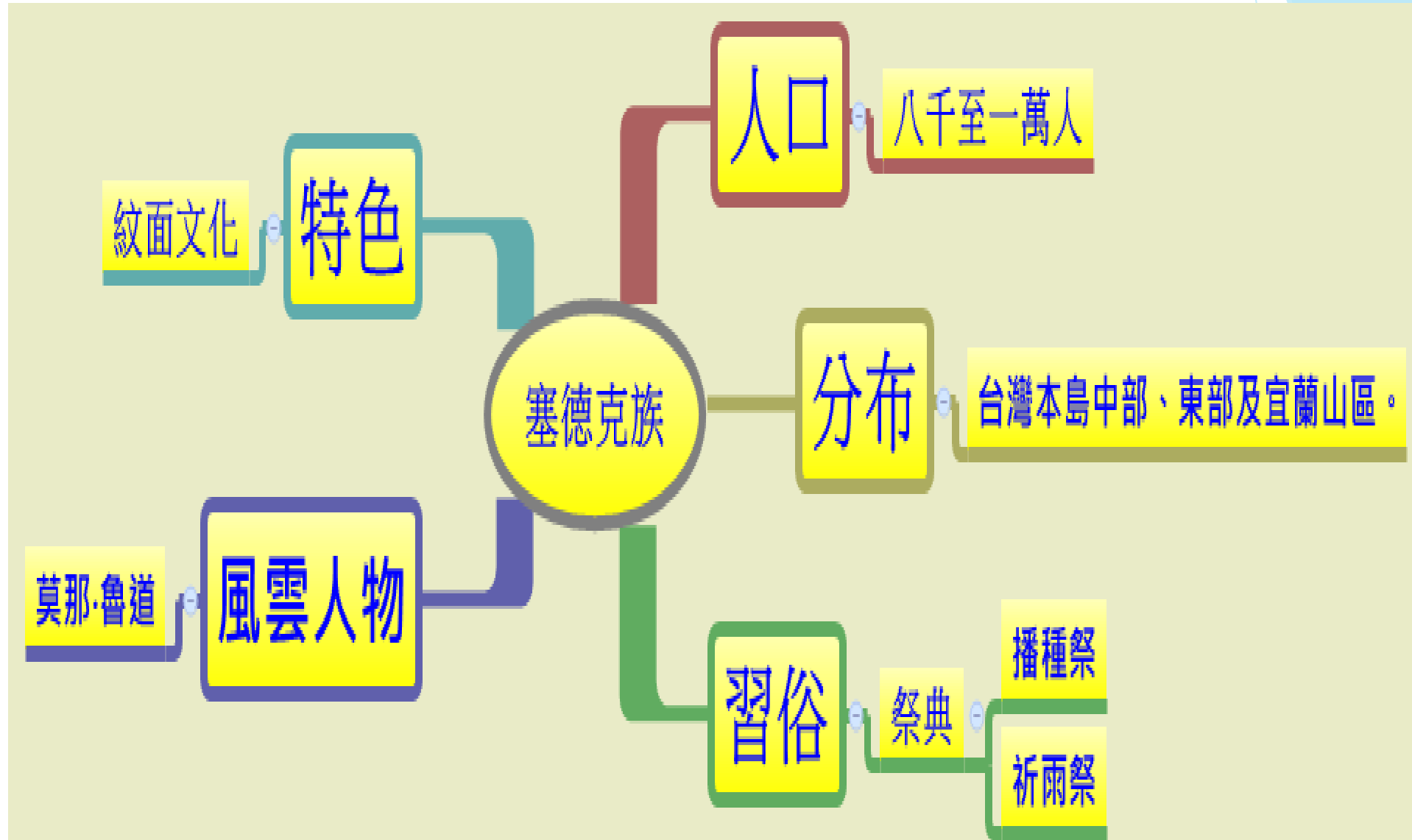
Research Instruments

- Students' self-evaluation on employing IBL in 6 dimensions:

  - Learning to learn, Knowledge construction, Reading ability, IL, Social and communication skills, Teacher and parents' assistance

- IL assessment: 25 multiple-choice questions

- IT measurement: 10 Word and 9 PowerPoint performance tests

- Big6 Worksheet

- Observation recording papers : 3 teachers and 6 students for semi-structured interviews

Results and Discussion

☐ Contributions of Collaboration among Teacher Librarian, Computer Teacher and Social Studies Teacher `Part1` →

☐ Students' Big6 Information Process `Part1` → `Part2` →

☐ Students' Information Literacy and Information Technology Skills →

☐ Students' Self-evaluation on IBL →

Contributions of Collaboration among Teacher Librarian, Computer Teacher and Social Studies Teacher

1. Students' learning was facilitated by collaborative activities to ensure they were well equipped with the necessary IL skills to search, locate, and use relevant information sources.

2. All three teachers agreed that the collaboration improved their teaching skills. They also indicated that teachers' immediate help and the group leader's ability had an effect on the implementation of the project.

Responsibilities of the Teachers

- Teacher Librarian
  - Provided students with a range of resources in a variety of formats, including print and non-print resources.
  - Big6 worksheet to enhance their IL skills
- Social Studies teacher
  - Guided students through the IBL projects by focusing on the subject aspect and research process of the projects.
- Computer teacher
  - Trained students with the computer skills such as Word, PowerPoint, Xmind and Google platform related skills.

Students' Big6 Information Process

☐ **Task Definition**

  ☐ Focused on culinary culture and simple questions.

  ☐ The Social Studies teacher gave students detailed information and examples of the unit.

  ☐ Students selected interested topics and posted high level questions after consulting their partners, the Social Studies teacher and teacher librarian.

☐ **Information Seeking**

  ☐ Students listed a variety of print, web, and databases sources, and chose among them.

Students' Big6 Information Process

- **Location and Access**
  - Having located and explored the relevant sources intellectually and physically, the students systematically recorded the information gathered.
  - Some groups obtained their sources through interlibrary loan.
- **Use of Information**
  - Students took notes and recorded bibliographic information.
  - Three groups did not apply APA style correctly when citing their sources.

Students' Big6 Information Process

☐ **Synthesis**

  ☐ Two groups chose to copy sources of information without good synthesis.

  ☐ Teachers opted to spend additional time teaching the students how to synthesize their information.

  ☐ The Computer teacher added one more class hour to prepare the students for oral presentation. The Computer teacher demonstrated animation techniques and application of correct information to PowerPoint backgrounds.

☐ **Evaluation**

  ☐ Students presented the organized information via PowerPoint slides and evaluated their work to ensure all criteria had been met.

  ☐ They shared their learning experiences. 70% of students reported they have learned and understood the unit better.

Students' Information Literacy and Information Technology Skills

Assessment	N	Pre-test		Post-test		t
		Mean	SD	Mean	SD	
Power point	23	17.78	7.38	28.28	10.14	4.07**
Word	23	11.00	5.09	23.85	2.68	8.25***
Information Literacy	23	63.82	18.90	78.55	5.09	4.20***

after-intervention scores are higher than before-intervention.

Students' self-evaluation on IBL mean distribution

Self-evaluation on IBL(number of questions)	Students' mean score	The highest mean item	Score of highest mean item
Learning to learn(5)	4.41	Learn how to do oral presentation	4.59
Knowledge construction(4)	4.59	Think deeply of the topics	4.59
Reading ability(4)	4.27	Share reading topics with classmates	4.50
Information literacy(6)	4.34	Be confident in identifying credible information sources	4.40
Social and communication skill(6)	4.5	Increase interaction with partners	4.63
Teacher and parents' guidance(4)	4.51	Support from teacher librarian is most significant	4.63

Discussion

☐ The students' IL and IT skills improved as they practiced IBL. This confirms the studies of the effectiveness of IBL over rote learning.

☐ Most students found it difficult to ask good questions at the initial stage. This is in line with the Eisenberg and Berkowitz (2014) study.

☐ The Big6 information process helps students grow and make real and lasting improvements, consistent with the studies of Song and David.

Discussion

- This research shows teachers' roles in helping students complete their IBL project, which helped them apply knowledge in problem-solving.

- The students engaged in six kinds of learning: (1) learning how to learn, (2) knowledge construction, (3) reading ability, (4) information literacy, (5) social skills, (6) receive teachers' and parents' guidance, similar to Kuhlthau, Maniotes, and Caspari's (2007) study.

- This research found that the students enjoyed this kind of learning because they had the chance to choose all topics according to their interests, just as Railsback (2002) pointed out: project based learning is student-driven, challenging, and meaningful to students.

Conclusions

Collaborative teaching and IBL:

☐ helped improve the students' information literacy and IT skills immensely,

☐ were effective and helped build a very close relationship between the teachers and the students.

Conclusions

- the students gained confidence and improved their problem solving skills running the project.

- The interviews demonstrated they liked the concept map and Xmind mapping.

- students received 6 kind of learning:1) learning how to learn, 2) knowledge construction, 3) reading ability, 4) information literacy, 5) social skills, 6) receive teachers' and parents' guidance.

- Teams with a strong leader and cooperative members generated better results.

- 80% of students found asking good questions very difficult.

Future Research

☐ Build a core team of teachers across subjects and a teacher librarian to reveal curriculum needs before the new semester starts. This would help teachers plan and intervene within and across schools.

☐ Train students with more website evaluation and reading synthesis practices before implementing IBL.

☐ Establish incentive rules to encourage initiative among groups and individuals.

☐ Develop an online IBL implementation platform for secondary school students.

Thank you and questions?