

Applying S-P Chart Analysis as Feedback Mechanism in SCORM Assessment Material

Presented by Griffon Team



Outline



- About Griffon Team
- Introduction
- About S-P Chart
- Product Overview & Demo
- Summary

About Griffon Team

About Griffon Team



- ❑ Griffon Team is Under Dept. of Multimedia Design (MD) in National Taichung Institute of Technology (NTIT) in Taichung City, Taiwan.

Team members (presenters)



□ Sheng-bo Chen(陳 聖博):

- Project Leader (SSPCA)
- SCORM Content Package Developer



Sheng-bo Chen

□ Chewei Hu(胡 哲維):

- SCORM Authoring Tool Developer



Chewei Hu

□ Yu-chen Lin(林 玉真):

- Sample Test Paper Provider



Yu-chen Lin

Adviser



□ Yung-chou Hsu(許 永洲):

- Chairperson of Dept. of MD, NTIT
- Adviser of Griffon Team



Yung-chou Hsu

Location



- ❑ Taichung City is in the Central Taiwan.
- ❑ Griffon Team Lab is here!!

Our Services



- ❑ **SCORM authoring tool developing**
- ❑ **SCORM content package technology**
- ❑ **Online Learning System Building**

Introduction

Motivation



- ❑ Teachers only can know students' learning status by their total scores, or rankings.
- ❑ We want to find another ways to help teachers to diagnose their students.
- ❑ We can doing learner diagnosis on SCORM LMS.
- ❑ If the teachers can get the diagnosis result in classroom in real-time, then they can focus on remediation.

What does SCORM 2004 do after online test



Learner	Satisfied	Measure	Completed
Joe Admin	notSatisfied	0.0	incomplete

- ❑ Only store the status of “satisfied”, “measure”, “completed” and “objectives” for a course.
- ❑ SCORM 2004 white papers did not define how to diagnose learners.

How to added diagnosis function on SCORM



- Add on LMS:
 - A general way
 - But we can not expect all LMSs have these functions.
- Into Content Package:
 - Sharable
 - Reusable
 - Interoperability

Who promoted S-P Chart



- In 1970s, the Japanese Scholar, Dr. Takahiro Sato promoted an analysis tool which was called **Student-Problem Chart** to diagnosis learners' situations after tests.

Purpose



- ❑ We adopted the S-P Chart as the learner diagnosis tool & feedback mechanism after online test.
- ❑ Integrated the S-P Chart into SCORM Content Package.

About S-P Chart

All references were from
Dr. Sato's books and researches

Name about S-P Chart



- ❑ S-P Chart stands for Student-Problem Chart.
- ❑ S = Students
- ❑ P = Problem = Question items

Response pattern



- ❑ This is a Response pattern.
- ❑ Q1 ~Q5 is about addition in mathematics.
- ❑ Q6 ~Q10 is about subtraction in mathematics.
- ❑ Andy is good in addition, bad in subtraction.
- ❑ Tim is good in subtraction, bad in addition.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total
Andy	1	1	1	1	1	0	0	0	0	0	5
Tim	0	0	0	0	0	1	1	1	1	1	5

Step 1: Get all answers from students



Correct Answers	C	D	B	A	B	C	A	D	B	A
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Andy	A	D	B	B	A	B	A	A	B	A
John	B	D	B	A	B	C	D	B	B	B
Frank	A	D	A	B	A	B	A	C	B	B
Mary	C	D	B	A	A	C	A	B	B	C
Helen	C	D	B	A	B	C	A	B	B	A
Jean	C	D	A	A	B	B	D	C	A	A
Bill	C	D	B	A	B	C	A	D	B	A
Eric	C	A	A	C	A	B	A	A	A	B
Jack	A	D	B	A	B	C	A	D	B	B
David	D	D	B	C	A	C	A	A	B	A
Michael	C	D	A	D	B	B	D	D	A	C
Brian	A	A	B	D	A	B	D	A	D	C
Kevin	B	D	B	A	C	C	D	D	D	C
Tim	C	D	B	A	D	B	A	A	C	B
Ben	C	A	B	A	C	B	A	A	C	B

Step 2: Make 1s and 0s



	Q2	Q3	Q7	Q4	Q1	Q9	Q6	Q5	Q10	Q8
Bill	1	1	1	1	1	1	1	1	1	1
Helen	1	1	1	1	1	1	1	1	1	0
Jack	1	1	1	1	0	1	1	1	0	1
Mary	1	1	1	1	1	1	1	0	0	0
John	1	1	0	1	0	1	1	1	0	0
David	1	1	1	0	0	1	1	0	1	0
Andy	1	1	1	0	0	1	0	0	1	0
Jean	1	0	0	1	1	0	0	1	1	0
Kevin	1	1	0	1	0	0	1	0	0	1
Tim	1	1	1	1	1	0	0	0	0	0
Michael	1	0	0	0	1	0	0	1	0	1
Ben	0	1	1	1	1	0	0	0	0	0
Frank	1	0	1	0	0	1	0	0	0	0
Eric	0	0	1	0	1	0	0	0	0	0
Brian	0	1	0	0	0	0	0	0	0	0

Step 3: Count Totals and Sort



	Q2	Q3	Q7	Q4	Q1	Q9	Q6	Q5	Q10	Q8	Rate of Correct Answers
Bill	1	1	1	1	1	1	1	1	1	1	10
Helen	1	1	1	1	1	1	1	1	1	0	9
Jack	1	1	1	1	0	1	1	1	0	1	8
Mary	1	1	1	1	1	1	1	0	0	0	7
John	1	1	0	1	0	1	1	1	0	0	6
David	1	1	1	0	0	1	1	0	1	0	6
Andy	1	1	1	0	0	1	0	0	1	0	5
Jean	1	0	0	1	1	0	0	1	1	0	5
Kevin	1	1	0	1	0	0	1	0	0	1	5
Tim	1	1	1	1	1	0	0	0	0	0	5
Michael	1	0	0	0	1	0	0	1	0	1	4
Ben	0	1	1	1	1	0	0	0	0	0	4
Frank	1	0	1	0	0	1	0	0	0	0	3
Eric	0	0	1	0	1	0	0	0	0	0	2
Brian	0	1	0	0	0	0	0	0	0	0	1
Number of Correct Answers	12	11	10	9	8	8	7	6	5	4	

Step 4: Draw S Curve (red line)



	Q2	Q3	Q7	Q4	Q1	Q9	Q6	Q5	Q10	Q8	Rate of Correct Answers	
Bill	1	1	1	1	1	1	1	1	1	1	10	
Helen	1	1	1	1	1	1	1	1	1	0	9	
Jack	1	1	1	1	0	1	1	1	0	1	8	
Mary	1	Origin			1	1	1	1	0	0	0	7
John	1				1	0	1	1	1	0	0	0
David	1	1	1	0	0	1	1	0	1	0	6	
Andy	1	1	1	0	0	1	0	0	1	0	5	
Jean	1	0	0	1	1	0	0	1	1	0	5	
Kevin	1	1	0	1	0	0	1	0	0	1	5	
Tim	1	1	1	1	1	0	0	0	0	0	5	
Michael	1	0	0	0	1	0	0	1	0	1	4	
Ben	0	1	1	1	1	0	0	0	0	0	4	
Frank	1	0	1	0	0	1	0	0	0	0	3	
Eric	0	0	1	0	1	0	0	0	0	0	2	
Brian	0	1	0	0	0	0	0	0	0	0	1	
Number of Correct Answers	12	11	10	9	8	8	7	6	5	4		

Step 5: Draw P Curve (blue line)



	Q2	Q3	Q7	Q4	Q1	Q9	Q6	Q5	Q10	Q8	Rate of Correct Answers
Bill	1	1	1	1	1	1	1	1	1	1	10
Helen	1	1	1	1	1	1	1	1	1	0	9
Jack	1	1	1	1	0	1	1	1	0	1	8
Mary	1	1	1	1	1	1	1	0	0	0	7
John	1	1	0	1	0	1	1	1	0	0	6
David	1	1	1	0	0	1	1	0	1	0	6
Andy	1	1	1	0	0	1	0	0	1	0	5
Jean	1	0	0	1	1	0	0	1	1	0	5
Kevin	1	1	0	1	0	0	1	0	0	1	5
Tim	1	1	1	1	1	0	0	0	0	0	5
Michael	1	0	0	0	1	0	0	1	0	1	4
Ben	0	1	1	1	1	0	0	0	0	0	4
Frank	1	0	1	0	0	1	0	0	0	0	3
Eric	0	0	1	0	1	0	0	0	0	0	2
Brian	0	1	0	0	0	0	0	0	0	0	1
Number of Correct Answers	12	11	10	9	8	8	7	6	5	4	

Step 6: Draw Disparity Area



	Q2	Q3	Q7	Q4	Q1	Q9	Q6	Q5	Q10	Q8	Rate of Correct Answers
Bill	1	1	1	1	1	1	1	1	1	1	10
Helen	1	1	1	1	1	1	1	1	1	0	9
Jack	1	1	1	1	0	1	1	1	0	1	8
Mary	1	1	1	1	1	1	1	0	0	0	7
John	1	1	0	1	0	1	1	1	0	0	6
David	1	1	1	0	0	1	1	0	1	0	6
Andy	1	1	1	0	0	1	0	0	1	0	5
Jean	1	0	0	1	1	0	0	1	1	0	5
Kevin	1	1	0	1	0	0	1	0	0	1	5
Tim	1	1	1	1	1	0	0	0	0	0	5
Michael	1	0	0	0	1	0	0	1	0	1	4
Ben	0	1	1	1	1	0	0	0	0	0	4
Frank	1	0	1	0	0	1	0	0	0	0	3
Eric	0	0	1	0	1	0	0	0	0	0	2
Brian	0	1	0	0	0	0	0	0	0	0	1
Number of Correct Answers	12	11	10	9	8	8	7	6	5	4	

Quantitative indexes



- ❑ Disparity Index
- ❑ Caution Index for Students (C.S)
- ❑ Caution Index for Problems (C.P)
- ❑ The C.S Groups
- ❑ The C.P Groups

Disparity Index



- A Quantitative for disparity area.

- If higher than 0.6, not good:
 - the question items do not match the content of the course.
 - the question items do not match the ability of students.

- If lower, it is good:
 - The question items match students' ability.

Caution Indexes (C.S & C.P)

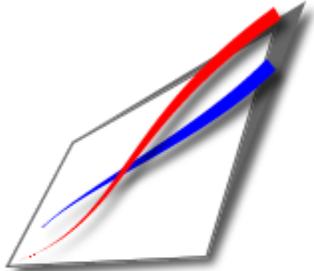


- If higher than 0.5:
 - In C.S: the teacher has to pay more attention to this student.
 - In C.P: the teacher has to modify that question item and make it better.

Product Overview & Demo

Griffon Team's product

Simple S-P Chart Analyzer (Short name: SSPCA)



Griffon Team

Simple S-P Chart Analyzer

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Griffon Team is under Dept. of Multimedia Design,
National Taichung Institute of Technology.

Version 1.02 (Preview)

Working Environment



- LMS Server:
 - Working with JSP implemented SCORM 2004 compatible LMS.
Ex: ADL Sample RTE 1.3.3 (Tested).
- Client Browsers:
 - MSIE 6.0 (Tested).
- Authoring Tool Requirement
 - Window 98 or above
 - Memory: 64mb

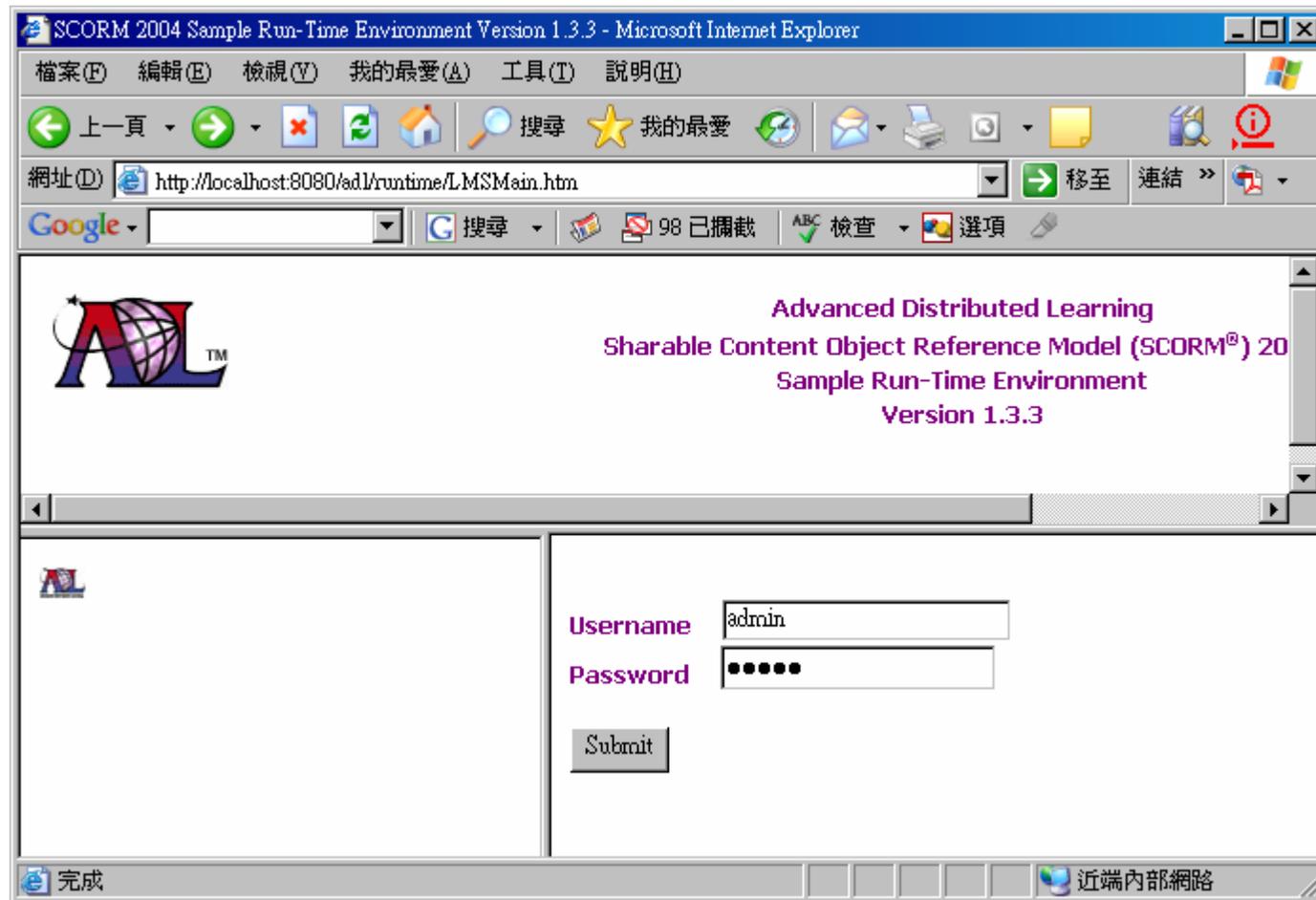
Main Functions



- SSPCA includes Two parts:
 1. SSPCA Content Package.
 2. SSPCA Authoring Tool.

SSPCA Content Package

Login as a Teacher



View S-P Table & Curves



SCORM 2004 Sample Run-Time Environment Version 1.3.3 - Microsoft Internet Explorer

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地址: http://localhost:8080/adl/runtime/LMSMain.htm

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Suspend Quit

Simple S-P Chart Analyzer (Test Paper)

- Online Test
 - Test Paper
 - Feedback

Problems	Q2	Q3	Q7	Q4	Q1	Q9	Q6	Q5	Q10	Q8	T.CA	R.C	C.S	Group
Students														
Bill	1	1	1	1	1	1	1	1	1	1	10	1.00	0.00	A
Helen	1	1	1	1	1	1	1	1	1	0	9	0.90	0.00	A
Jack	1	1	1	1	0	1	1	1	0	1	8	0.80	0.57	A'
Mary	1	1	1	1	1	1	1	0	0	0	7	0.70	0.00	B
David	1	1	1	0	0	1	1	0	1	0	6	0.60	0.50	B
John	1	1	0	1	0	1	1	1	0	0	6	0.60	0.50	B
Andy	1	1	1	0	0	1	0	0	1	0	5	0.50	0.40	B
Jean	1	0	0	1	1	0	0	1	1	0	5	0.50	1.00	B'
Kevin	1	1	0	1	0	0	1	0	0	1	5	0.50	0.70	B'
Tim	1	1	1	1	1	0	0	0	0	0	5	0.50	0.00	B
Ben	0	1	1	1	1	0	0	0	0	0	4	0.40	0.40	C
Micheal	1	0	0	0	1	0	0	1	0	1	4	0.40	1.20	C'
Frank	1	0	1	0	0	1	0	0	0	0	3	0.30	0.33	C

完成 近端內部網路

Show Student and Problem Groups



1	1	10	1.00	0.00	<u>A</u>
1	0	9	0.90	0.00	<u>A</u>
0	1	8	0.80	0.57	<u>A'</u>
0	0	7	0.70	0.00	<u>B</u>
0	0	6	0.60	0.50	<u>B</u>

Group: Effective Learning

Student Groups

<u>U</u>	1	U	U	U	U	U	U	U
12	11	10	9	8	8	7	6	5
0.80	0.73	0.67	0.60	0.53	0.53	0.47	0.40	0.33
0.10	0.35	0.55	0.15	0.75	0.15	0.00	0.29	0.37
<u>A</u>	<u>A</u>	<u>A'</u>	<u>A</u>	<u>A'</u>	<u>A</u>	<u>B</u>	<u>B</u>	<u>B</u>

Group: Difficulty

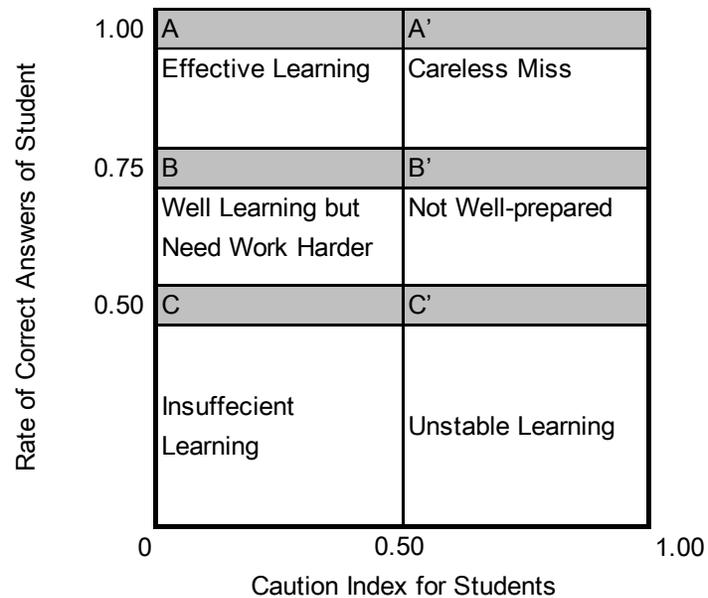
Problem Groups

The C.S Groups & The C.P Groups



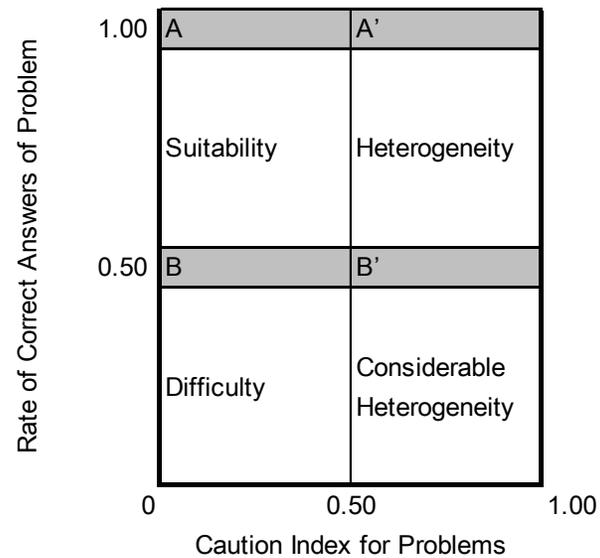
Students	Problems										T.CA	R.C	C.S	Group
	Q2	Q3	Q7	Q4	Q1	Q9	Q6	Q5	Q10	Q8				
Bill	1	1	1	1	1	1	1	1	1	1	10	1.00	0.00	A
Helen	1	1	1	1	1	1	1	1	1	0	9	0.90	0.00	A
Jack	1	1	1	1	0	1	1	1	0	1	8	0.80	0.57	A'
Mary	1	1	1	1	1	1	1	0	0	0	7	0.70	0.00	Group: Careless Miss
John	1	1	0	1	0	1	1	1	0	0	6	0.60	0.50	B
David	1	1	1	0	0	1	1	0	1	0	6	0.60	0.50	B
Andy	1	1	1	0	0	1	0	0	1	0	5	0.50	0.40	B
Jean	1	0	0	1	1	0	0	1	1	0	5	0.50	1.00	B'
Kevin	1	1	0	1	0	0	1	0	0	1	5	0.50	0.70	B'
Tim	1	1	1	1	1	0	0	0	0	0	5	0.50	0.00	B
Micheal	1	0	0	0	1	0	0	1	0	1	4	0.40	1.20	C'
Ben	0	1	1	1	1	0	0	0	0	0	4	0.40	0.40	C
Frank	1	0	1	0	0	1	0	0	0	0	3	0.30	0.33	C
Eric	0	0	1	0	1	0	0	0	0	0	2	0.20	0.71	C'
Brian	0	1	0	0	0	0	0	0	0	0	1	0.10	0.25	C
N.CA	12	11	10	9	8	8	7	6	5	4				
R.C	0.80	0.73	0.67	0.60	0.53	0.53	0.47	0.40	0.33	0.27	Disparity Index: 0.658 Total Mean: 0.533			
C.P	0.10	0.35	0.55	0.15	0.75	0.15	0.00	0.29	0.37	0.55				
Group	A	A	A'	A	A'	A	B	B	B	B'				

C.S Matrix



Source: Dr. Takahiro Sato's research, Japan

The C.P Matrix



Source: Dr. Takahiro Sato's research, Japan

Disparity Index

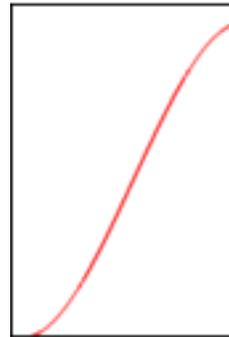


1	1	0	0	0	0	0	5	0.50	0.00	<u>B</u>
0	1	0	0	1	0	1	4	0.40	1.20	<u>C'</u>
1	1	0	0	0	0	0	4	0.40	0.40	<u>C</u>
0	0	1	0	0	0	0	3	0.30	0.33	<u>C</u>
0	1	0	0	0	0	0	2	0.20	0.71	<u>C'</u>
0	0	0	0	0	0	0	1	0.10	0.25	<u>C</u>
9	8	8	7	6	5	4	<div style="background-color: #cccccc; padding: 10px; border: 1px solid #ccc;"> Disparity Index: 0.658 Total Mean: 0.533 </div>			
0.60	0.53	0.53	0.47	0.40	0.33	0.27				
0.15	0.75	0.15	0.00	0.29	0.37	0.55				
<u>A</u>	<u>A'</u>	<u>A</u>	<u>B</u>	<u>B</u>	<u>B</u>	<u>B'</u>				

Smooth S-P Curve



<u>R.C</u>	0.80	0.73	0.67	0.60	0.53	0.53	0.47	0.40	0.33	0.27	Disparity Index: 0.658 Total Mean: 0.533
<u>C.P</u>	0.10	0.35	0.55	0.15	0.75	0.15	0.00	0.29	0.37	0.55	
Group	<u>A</u>	<u>A</u>	<u>A'</u>	<u>A</u>	<u>A'</u>	<u>A</u>	<u>B</u>	<u>B</u>	<u>B</u>	<u>B'</u>	



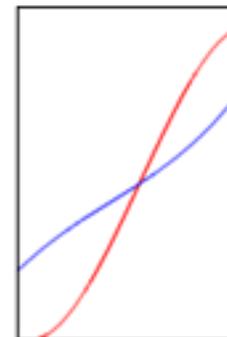
S Curve

From this S Curve, It stands for a The Basic Academic Competence Test



P Curve

From this P Curve, It shows the Questions were a little difficult

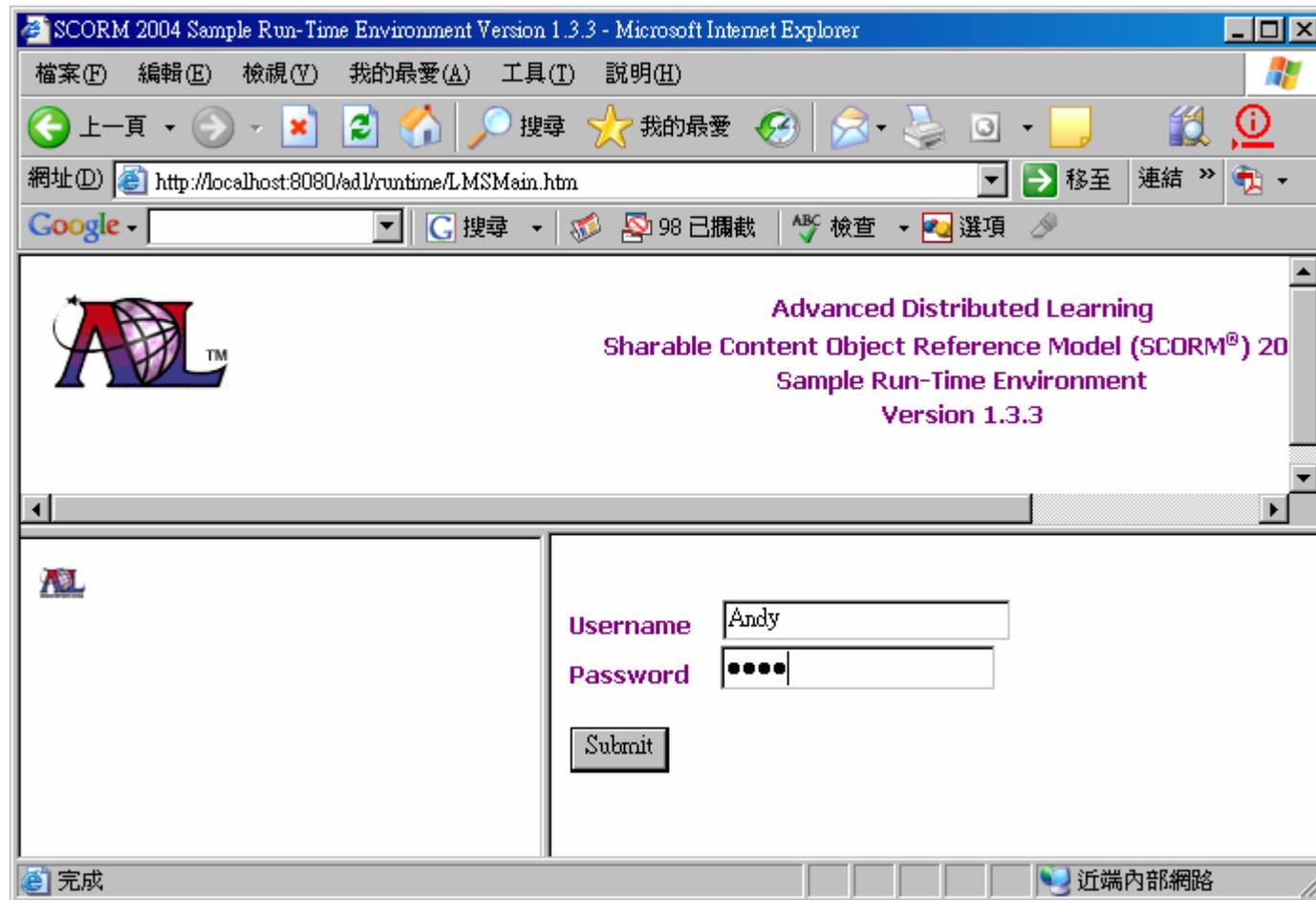


S-P Curve

From this S-P Curve, this exam looks like a Basic Academic Competence Test, the Disparity Index is high (Over 0.6), and the total mean is medium, you can know the achievement of your students very clearly.

About the Sample Test of this Demo

Login as a Student



Answer the Questions



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Version 1.3.3

Suspend Quit

Simple S-P Chart Analyzer (Test Paper)
Online Test
Test Paper
Feedback

Grammar Test

1. He always _____ swimming every Saturday.
A. went
B. go
C. goes
D. going
2. Miss Lin teaches English at a public high school in Taipei. She _____ there since 2002.
A. is
B. was
C. will be
D. has been
3. Listen! This bird _____.
A. sings

完成 近端內部網路

Submit Answers



SCORM 2004 Sample Run-Time Environment Version 1.3.3 - Microsoft Internet Explorer

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Simple S-P Chart Analyzer (Test Paper)
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9. She _____ on the beach of Hawaii at this time tomorrow.
A. is lying
B. will be lying
C. lies
D. is going to lying

10. I saw the movie called Home Alone last Saturday. I _____ it before.
A. had never seen
B. have never seen
C. never saw
D. didn't see

Submit Answers

近端內部網路

Get Feedback



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網址(📍) <http://localhost:8080/adl/runtime/LMSMain.htm> 移至 連結 >>

Google 搜尋 98 已擱截 ABC 檢查 選項

 **Advanced Distributed Learning**
Sharable Content Object Reference Model (SCORM®) 2004
Sample Run-Time Environment
Version 1.3.3

Suspend Quit

Simple S-P Chart Analyzer (Test Paper)
 Online Test
 Test Paper
 Feedback

Dear Andy:
You belong to the Type of
Well Learning but Need Work Harder at this Test.

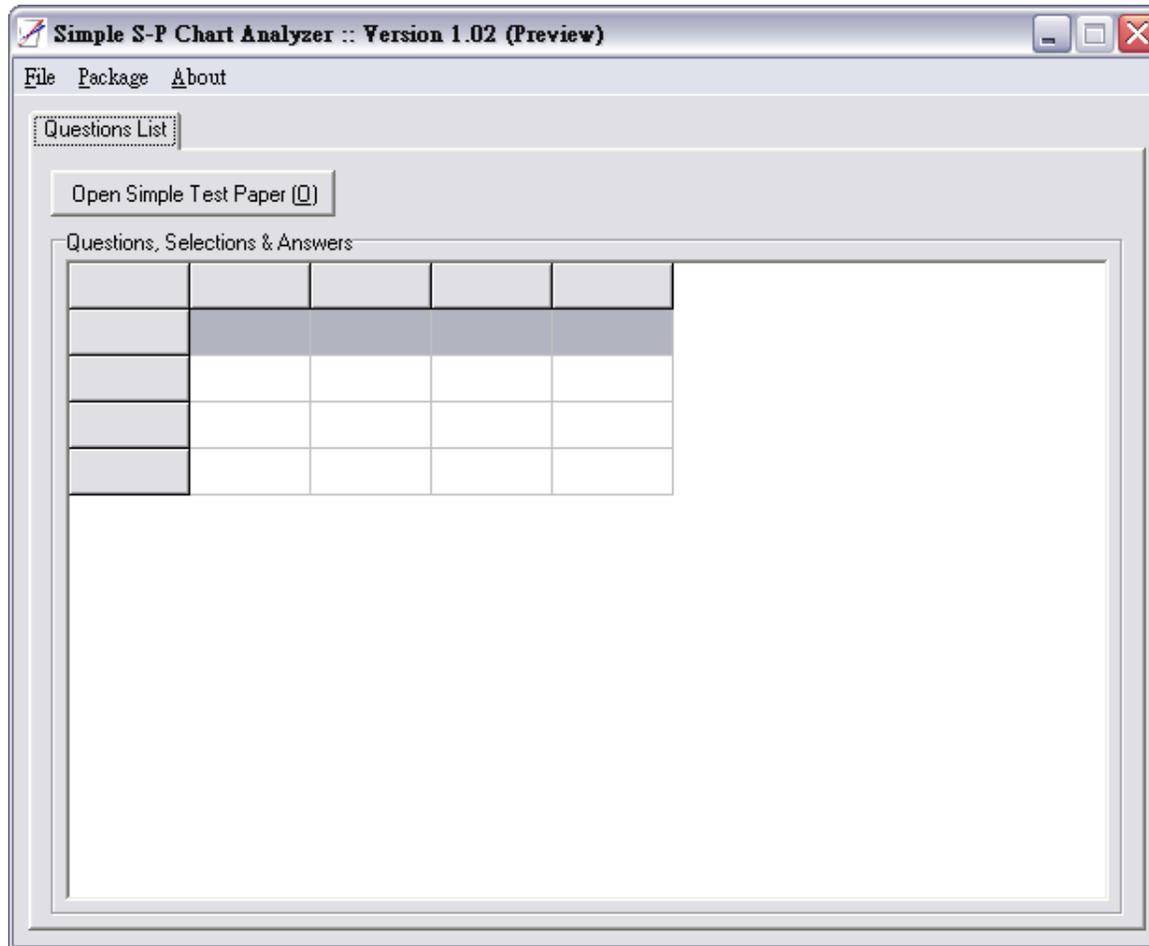
完成 近端內部網路

SSPCA Authoring Tool

Easy to use & Easy to begin!

You can use this authoring tool to make your own Simple S-P Chart Analyzer content package very easily.

Add a New or Edit an Existed Test Paper



Easy to View the List of Questions



Simple S-P Chart Analyzer :: Version 1.02 (Preview)

File Package About

Questions List Questions Editor Users

New Test Paper (N) Open Test Paper (O)

Questions, Selections & Answers

No.	Question	Answer	Option A	Option B	Option C	Option D
1	No matter how hard she tried to re-	B	fun	sense	sure	believe
2	Grandma's hair is so lovely and ___	B	soft	lazy	calmly	gently
3	People who want to lose weight sh	B	eating	to eat	eat	to eating
4	You can cancel the ticket _____,	C	until	as long as	as if	while
5	I'll let you use my car but you must	C	during	by	until	since
6	Mathematics isn't Peter's best subj	B	succeeds	decides	judges	fails
7	The novel _____ into many langua	B	has translate	is translating	will be transla	has been tra
8	katie has always been a hardwork	C	so does	also is	so has	either is
9	Barry had to cheer his wife up afte	C	turned down	put on	passed out	dropped by
10	Do you have any books on child-r	C	any	one	is	anyone

Easy and Simple to Edit the Questions



Simple S-P Chart Analyzer :: Version 1.02 (Preview)

File Package About

Questions List Questions Editor Users

Subject: English Practice #1 No. 1

Question Content

No matter how hard she tried to read it, the story still didn't make any _____ to her.

Options

(1) fun

(2) sense

(3) sure

(4) believe

Current Answer: B

Operation

Modify (M)

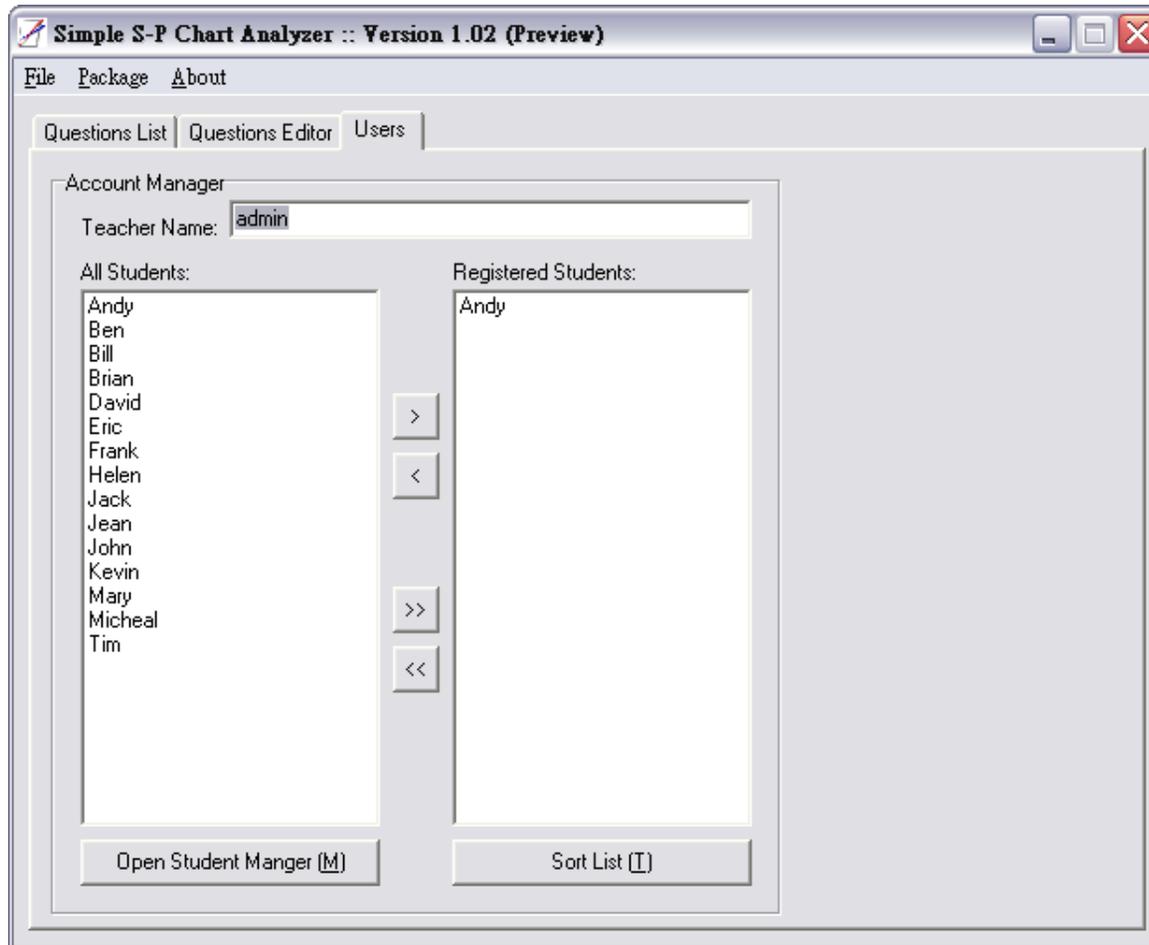
New (N)

Selection

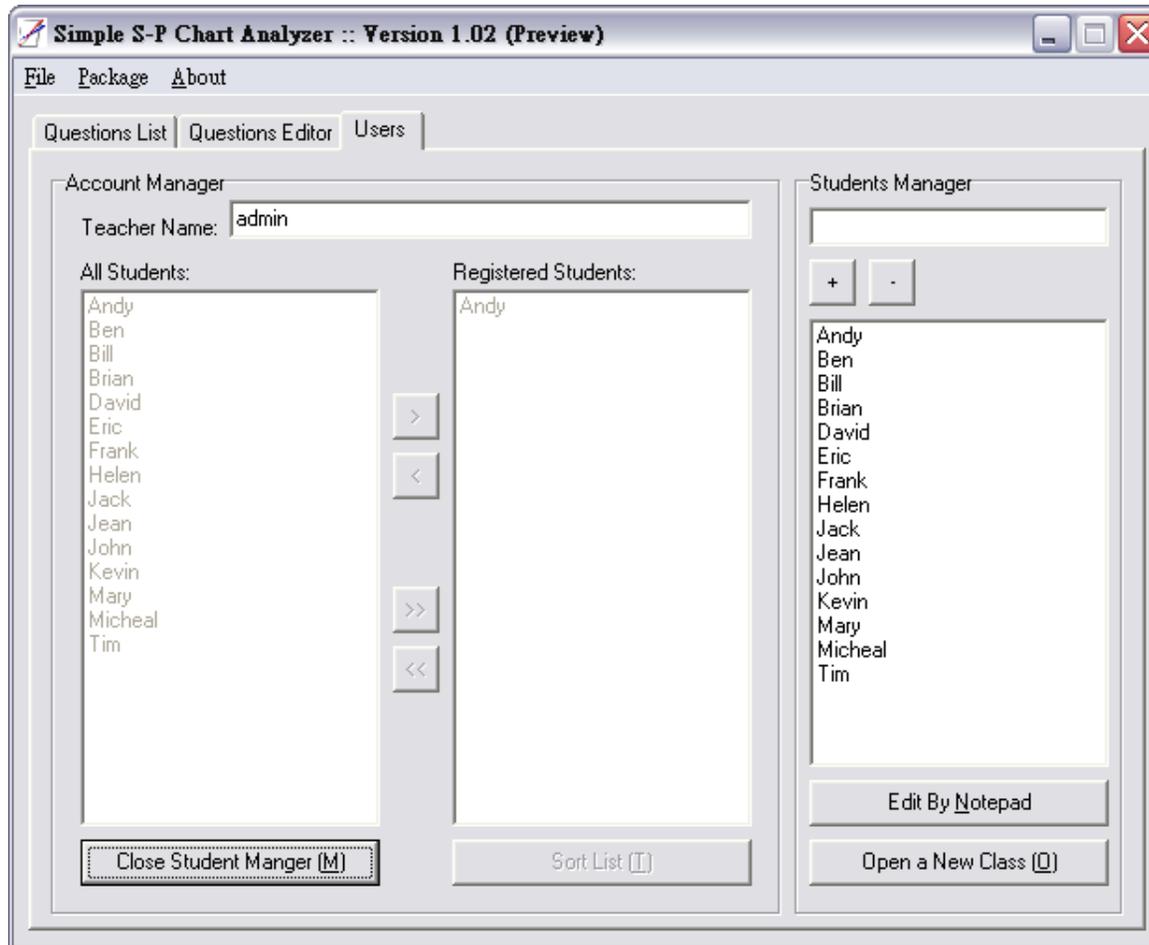
<< First (F) < Back (B) Next (N) > Last (L) >>

Select User (U)

Add the Teacher's Name



Edit and Select Students



Summary

The advantages



□ Teachers :

- Do not need to check everyone's test paper;
- Know the diagnosis in real-time,
- Not merely know a learner's situation from his/her total score
- Assist teachers to pay more attention on students' needs.
- Improve teacher's teaching methods.

□ Student:

- Also can know the diagnosis result in real-time.

Apply SSPCA to your course



- Independently
- With SCORM material.

Reviewing



- It provides:
 - S-P Chart
 - Caution index
 - Disparity Index
 - S-P Curve
- And a friendly, simple authoring tool for teachers.

Something you need to know



- ❑ A tool is always a tool, it cannot substitute the teacher's roll in the classroom.
- ❑ Another purpose of this work is to push teachers:
 - To pay more attention to their students.
 - To find out the reasons of students with low achievements
 - To check if the question items or their teaching methods are good or not.

Feature works



- ❑ Work under the other LMSs.
- ❑ Bug fixes.
- ❑ Provide more information to help teachers work on diagnosing.
- ❑ Finish alpha test, beta test.
- ❑ Looking for teachers to be testers.
- ❑ It will be released in August, 2006.

Contact Us



□ e-mail:

- artalose@gmail.com
- s18934106@ntit.edu.tw

□ Web Site:

- <http://md.ntit.edu.tw/griffon/>

**Thank you very much
& Happy Chinese New Year!**