

A Study to Assess the Effectiveness of the Jigsaw Reading Technique in Improving the Reading Skills among High School Children

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ABSTRACT

Introduction: Jigsaw Reading Technique is one kind of cooperative learning strategy which allows dividing the students in a group to improve reading skills by giving tasks (like reading paragraph) to them. In Jigsaw learning method, students are assigned to a small group that composes different level of skills like a piece of Jigsaw puzzle.

Aim: To determine the effectiveness of the Jigsaw Reading Technique in improving reading skills among high school children.

Materials and Methods: The interventional study design was a post-test control group study with a quantitative research approach. A simple random sampling method was used to collect the data. The present study was carried out in the selected school of Tah Kelapur district. Yavatmal. The sample size was 60. Validated structured questionnaires were used. Data were collected. The software used in the analysis was SPSS 24.0. Descriptive Statistics and Frequency distribution and comparison were presented for categorical variables.

Results: The findings show that assessing the reading skills in the experimental and control group was divided into five categories skimming, scanning, awareness about synonyms and antonyms, deduce the meaning of unfamiliar words from the text, infer mood and author's attitude or tone. The experimental group was reading with a positive attitude. The mean reading score of the control group was 2.36, the experimental group was 12.43 (p -value=0.001), the calculated t -value is 40. Therefore, the jigsaw reading ability score among high school students is statistically interpreted to have been successful. There was no significant association between reading skill scores among high school students concerning the control group and experimental with any other demographic variables.

Conclusion: The comparison of the high school students' reading skill scores shows a significant difference between the control group and experimental group, that is after the completion of this study, it is revealed that assessment of jigsaw reading technique in improving reading skills among high school children is effective.

Keywords: Cooperative learning strategy, High school students, Jigsaw technique

INTRODUCTION

Jigsaw method is an activity that is characterised by the conversion of symbols or letters into a sentence or word which posses meaning to the individual. The end goal of reading is to read and understand the written matter to assess and use it for one who requires it. Reading is the prime source of gathering knowledge. There may be many purposes of reading like, for entertainment, to get information, enlightened, the ultimate goal of reading is to gain knowledge and to increase the level of knowledge. Reading is delightful for the people who love to read. It helps an individual in building up his vocabulary, creativity and comprehension. It has the power to take a person where he/she has never been, a person he never met, and gets himself involved with adventures and characters by the power of imaginations. Reading is very useful for a child to learn, a child can learn everything by reading. Francis Bacon said in his essay "Of Studies", it tells that reading makes a man complete. Reading is a very interesting process. It involves the conduction of dialogue, engaging with text to decode it, allocate meaning and interpretation. Skilled readers can understand the reading process and use various methods to make reading effective. "Instructional scaffolding" is the term used to make the understanding process effective and efficient by content area teachers [1].

In any normal classroom, teacher does not involve a student in any activity because of which the students are unable to improve their knowledge. To overcome this problem, Aronson and students brought Jigsaw method in which a classroom well structured, with a cooperative learning situation, to develop inter-personal skills,

motivation in learning and increase in student's achievements [2]. The Jigsaw method is revised for a few time, in Jigsaw II, the students were provided with Expert Sheets on which, they have to write their notes and explain it to their group. Jigsaw IV includes teacher based features such as the introduction of the topic, questions for the expert group, revision before submitting individual's assessment and focusing on a topic which is not discussed in the Jigsaw classroom [3].

Maryam Jafariyan Shahri, Matlabi, Reza Esmaeili, Mojtaba Kianmehr said that the jigsaw learning technique is one form of cooperative learning method which has been successfully using the improve academic achievement among the student. The present study was conducted to compare the effectiveness of the jigsaw technique with the lecture-based teaching method for the medical student physics course. More than 80% of the participant disagreed or agreed with all the items that assess their satisfaction with what they had learned in jigsaw class [4]. Nurbianta N and Dahlia H found that reading comprehension is a major goal of language instruction in the teaching framework of English learning in senior high school. As one of the macro skills of English, it is being an important part of English language teaching. So, the teacher should teach actively to help students get the ultimate goal of reading instruction. Jigsaw is one of cooperative learning which is interested in applied to boost student's motivation in learning English, especially the reading skills. In their study, 100 students of seventh grade of SMPN 13 Berau, and the sample was 30 students taken by random sampling technique. The result of post-test slightly higher than pretest in conducting jigsaw method in SMPN 13 Berau, There is a significant

difference of jigsaw method used that exists on respondents significantly students in SPMN 13 Berau during English as a second language [5].

Hence, the hypothesis of present study is

H₀: There is no significant difference between reading skills among high school children in the experimental and control group.

H₁: There is a significant difference between reading skills among high school children in the experimental and control group.

MATERIALS AND METHODS

True experimental test control group design was used in the study. The experimental group is exposed to a jigsaw and both groups are measured. The study was conducted in Shri. Gadge Maharaj High school and Junior college, Umri (road), Dist. Yavatmal. The study was conducted from 23 December 2019 to 28 December 2019 after getting ethical permission (Ref. no: DMIMS(DU)/IEC/Sep-19/8478). By using a simple random sampling technique, Sample size: 30-Experimental group, 30-Control group, hence total of 60 high school children were selected based on the calculation.

$$n = Z_{\alpha/2} * p * (1-p) / d^2$$

This means, 28 or more measurements/surveys are needed to have a confidence level of 95%, so that the real value is within $\pm 5\%$ of the measured/surveyed value. Where, n =sample size Z_{α} is the level of significance at 5% i.e., 95% Confidence Interval (CI)=1.96, p =population=desired error of margin=5% Considering 95% CI and 20% allowable error, the sample size was calculated to include 28 respondents. The high school children were informed and explained the objective of the study. The written informed consent duly signed by the Principal was obtained.

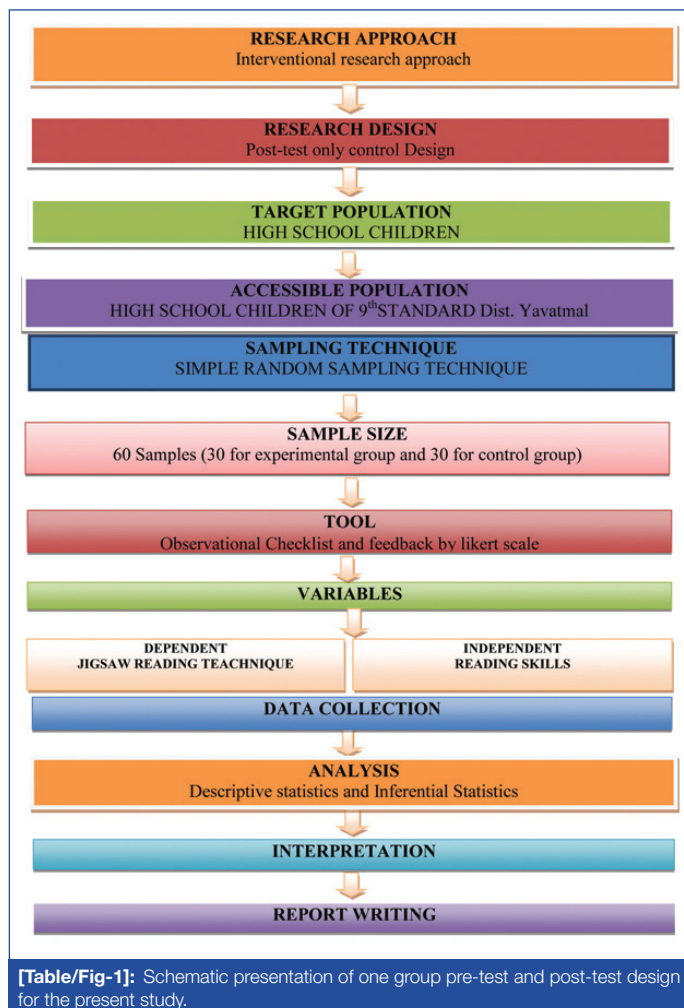
Inclusion criteria: Students in the selected area who are willing to participate in the study.

Exclusion criteria: Students who attended the jigsaw reading technique.

Demographic variables were collected in terms of Age group selected, 13-17 years because some students take admission early, some students get fail, Gender. An observational checklist with a Likert scale (The Effect of Jigsaw Technique on the Students' Laboratory Material Recognition and Usage Skills in General Physics Laboratory-I Course) [6], which is attached in Annexure-VII and were classified in different areas, such as: (i) Skimming; (ii) Scanning; (iii). Awareness about synonyms and antonyms; (iv) Deduce meaning of unfamiliar words from the text; (v) Infer mood and author's attitude or tone.

After that, feedback was taken from the experimental group with the help of a Likert scale. An English text was given, for example, The story of tea was given to both groups and reading skills were assessed of both the groups. The Likert scale was marked as strongly disagree, disagree, neutral, agree, and strongly agree. The prepared tool was validated by ten experts, who were from the Nursing Department, also took the help from English teachers of the school that has done the master's in English. By using the Parallel form method of reliability, it is found to be 0.8962; hence the tool was found to be reliable, valid, and feasible. The interview technique was processed for 60 samples as planned, to gather demographic information and reading skill was assessed. On the first day of the data collection, the reading skill was assessed of the control group and the experimental group, was also assessed for punctuation, pronunciation, full stop, answer the synonyms and antonyms, the unfamiliar word, etc., and for reading text, five minutes were given to each student. They were divided into two groups; thirty participants in each group. The experimental group was divided by using the jigsaw technique. The experimental group again divided one aspect of a topic for example, one group given synonyms, other group antonyms, and

each group communicates together for sharing the information and discuss, until they learn from each other (5-10 min) and master the topic. Each group was given 20-30 minutes, so that each student could present his subtopic. Finally, the teacher can randomly ask students to question one of the subtopics for the entire class. Based on the reading skill, each study participant was asked individually for his/her answers from the same text. As collected, the responses were arranged in tabular form to conduct statistical analyses, which are mentioned in the following sections. The steps of methodology including statistical analysis is described in [Table/Fig-1] as follows:



[Table/Fig-1]: Schematic presentation of one group pre-test and post-test design for the present study.

STATISTICAL ANALYSIS

The collected data were coded, tabulated, and analysed by using descriptive statistics (mean percentage, standard deviation) and inferential statistics. The software used in the analysis was Statistical Package for the Social Sciences (SPSS) 24.0 and Graph Pad Prism 7.0 version and $p < 0.05$ is considered as a level of significance. The statistical tests used for the analysis of the result were: Students unpaired t-test, Pearson' Correlation Coefficient and Reliability Analysis.

RESULTS

A 76.7% of the high school children in the control group and 93.3% in the experimental group were in the age group of 13-14 years and 23.3% of high school children in the control group and 6.70% in the experimental group were in the age group of 15-16 years. 76.7% of the high school children in the control group and 23.3% in the experimental group were males and 23.3% of the high school children in the control group and 76.7% in the experimental group were females [Table/Fig-2]. Five groups into which the assessment was done for both control and experiment groups are mentioned in [Table/Fig-3].

Demographic variables	Control group	Experimental group
Age (Years)		
13-14	23 (76.7%)	28 (93.3%)
15-16	7 (23.3%)	2 (6.7%)
Gender		
Male	23 (76.7%)	7 (23.3%)
Female	7 (23.3%)	23 (76.7%)

[Table/Fig-2]: Showing the frequency distribution of high school children according to their demographic characteristics. n=30.

Sr. No.	Questions	Control group	Experimental group
A.	Skimming:		
1.	Whether the reading was fluent.	0 (0%)	27 (90%)
2.	Did the students are taking a pause when there is a full stop?	4 (13.33%)	26 (86.67%)
3.	Did the students follow all punctuation marks while reading?	1 (3.33%)	28 (93.33%)
B.	Scanning:		
1.	Whether the reading pronunciation was clear.	4 (13.33%)	25 (83.33%)
2.	Did the students read full-sentence continuously?	4 (13.33%)	27 (90%)
3.	Did the students read the text accurately?	4 (13.33%)	29 (96.67%)
C.	Awareness about Synonyms and Antonyms:		
1.	Did the students find out the synonyms and antonyms from the text?	5 (16.67%)	24 (80%)
2.	Did the students able to answer the synonyms and antonyms of the given word.	3 (10%)	25 (83.33%)
3.	Whether the students are confused about the synonyms and antonyms.	20 (66.67%)	18 (60%)
D.	Deduce Meaning of Unfamiliar Words from the Text:		
1.	Did the student can find out the unfamiliar word from the text.	1 (3.33%)	16 (53.33%)
2.	Whether the students can answer the multiple-choice question quickly.	4 (13.33%)	26 (86.67%)
3.	Did the students can choose the correct alternative to answer the question.	10 (33.33%)	23 (76.67%)
E.	Infer Mood and Author's Attitude or Tone:		
1.	Whether the students are interested while reading.	0 (0%)	23 (76.67%)
2.	Did the students are using appropriate tone while reading?	8 (26.67%)	27 (90%)
3.	Did the students are reading with a positive attitude?	3 (10%)	25 (83.33%)

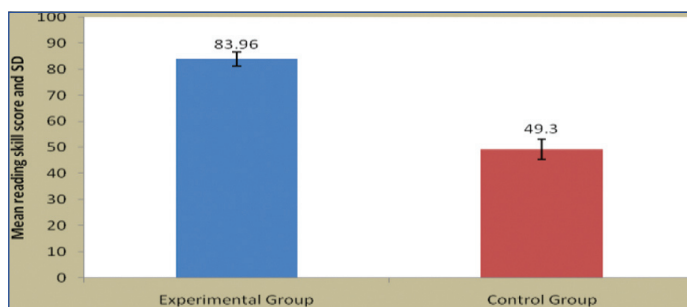
[Table/Fig-3]: Assessment with the level of reading skill in experimental and control group. n=30.

A 3.33% of high school students in the experimental group and 83.33% of the high school students in the control group had a poor level of knowledge score, 6.67% in the experimental group and 13.33% of children in the control group had an average, 16.67% in experimental and 3.33% of the children in the control group had good and 73.33% of the students in experiment group had an excellent level of knowledge score. The mean score in high school students of the experimental group was 12.43 ± 2.99 and in the control group it was 2.36 ± 1.67 [Table/Fig-4].

The comparison of the high school student's reading skill scores [Table/Fig-5]. While standard deviation and mean differential values are measured and the student's unpaired test is applied at a 5 percent meaning point. The tabulated value for $n=30+30-2$ i.e., 58 degrees of freedom was 2. For the overall reading skill score of high school students, which is a statistically acceptable level of significance ($p=0.001$), the calculated t-value i.e., 40 is much higher than the tabulated value at 5 percent level of significance.

Level of jigsaw reading skill	Score range	Level of jigsaw reading skill	
		Control group	Experimental group
Poor	0-25%	25 (83.33%)	1 (3.33%)
Average	26-50%	4 (13.33%)	2 (6.67%)
Good	51-75%	1 (3.33%)	5 (16.67%)
Excellent	76-100%	0 (0%)	22 (73.33%)
Minimum score		00	3
Maximum score		08	15
Mean reading score		2.36 ± 1.67	12.43 ± 2.99
Mean % reading score		15.77 ± 11.1	82.86 ± 2.99

[Table/Fig-4]: Assessment with the level of jigsaw reading technique in the experimental and control group. n=30.



[Table/Fig-5]: Significance of difference between reading skill score in the experimental and control group of high school children. n=30.

This is a feedback of the students regarding the jigsaw reading technique of the experimental [Table/Fig-6]. There was a not significant association ($p>0.05$) of reading skill scores of high school children with any demographic variables of the experimental group [Table/Fig-7]. There was a not significant association ($p>0.05$) of reading skill scores of high school children with any demographic variables of the control group [Table/Fig-8].

DISCUSSION

The study intends to promote high school children reading skills by using the jigsaw technique. The mean score in high school students of the experimental group was 12.43 (SD= ± 2.99) and in the control group, it was 2.36 (SD= ± 1.67), show that the scheduled reading skill was effective. For the overall reading skill score of high school students, which is a statistically acceptable level of significance, the calculated t-value i.e., 40 is much higher than the tabulated value at a 5 percent level of significance.

A similar study was carried out by Morales DCB et al., to determine the effects of the jigsaw as part of a comparative language learning approach on students' reading comprehension skills, in a public high school in pasto. The research design is pre-experimental. There are two groups of 11 grade which were selected as a sample, one is an experimental group (n=20) and another is the control group (n=25). In this pre-experimental research, "pre-test/post-test" data was collected through data matrices. The total sample size is 45. The statistic analysis revealed that there was a significant difference between the experimental and control group in terms of reading comprehension skills after the application of treatment [7].

A study carried out by Ajmeri and Samir D studied the effect of the jigsaw technique on learning the concept of the principal and methods of teaching. The research has been performed on the second-year student of the Ataturk University Primary School Teaching Division. A total of 80 students have participated in the research, experimental group with the jigsaw technique (n=40) and a control group (n=40) with the classical learning method. The result shows that technique has a positive influence on learning and this technique should be used in all phases of education [8].

Research by Saputro IE the purpose of the study is to enhance the students' reading comprehension focused on the narrative text

Sl. No.	Questions	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1.	Do you think the jigsaw method helps in improving the reading skills of children?				17 (56.7%)	13 (43.3%)
2.	Do you think working in a group puts less pressure on individual reading?				19 (63.3%)	11 (36.7%)
3.	Do you think this jigsaw method can be used in the teaching activity?				22 (73.3%)	8 (26.7%)
4.	Do you think it helps to increase the level of confidence?			1 (3.3%)	23 (76.7%)	6 (20%)
5.	Do you feel the conducting atmosphere was good?			13 (43.3%)	11 (36.7%)	6 (20%)
6.	Do you feel it make group co-ordination?			1 (3.3%)	22 (73.3%)	7 (23.3%)
7.	Do you think it improves the student's ability to read fluently?			2 (6.7%)	20 (66.7%)	8 (26.7%)
8.	Do you think this method is helpful to concentrate?			2 (6.7%)	17 (56.7%)	11 (36.7%)
9.	Do you think this method was understandable?		1 (3.3%)	1 (3.3%)	22 (73.3%)	6 (20%)
10.	Do you feel it enable the learner to help weaker learners in the group?			3 (10%)	20 (66.7%)	7 (23.3%)
11.	Do you think it stimulates critical thinking?			2 (6.7%)	23 (76.7%)	5 (16.7%)
12.	Do you think it helps the learner to actively participate in the learning process?			2 (6.7%)	21 (70%)	7 (23.3%)
13.	Do you feel this is an effective method for training and personal development?			2 (6.7%)	15 (50%)	13 (43.3%)
14.	Do you get a positive experience with this learning method?			1 (3.3%)	21 (70%)	8 (26.7%)
15.	Do you feel comfortable using this learning method in your practices?			1 (3.3%)	22 (73.3%)	7 (23.3%)
16.	Do you satisfied with this learning method.			3 (10%)	18 (60%)	9 (30%)
17.	Do you think it helps to improve the status of knowledge?				20 (66.7%)	10 (33.3%)
18.	Do you think reading is the most important skill to touch the world around you?			1 (3.3%)	8 (26.7%)	21 (70%)
19.	Do you think it helps to enhance problem-solving skills?				19 (63.3%)	11 (36.7%)
20.	Do you think the time for the class was sufficient?		1 (3.3%)	20 (66.7%)	5 (16.7%)	4 (13.3%)

[Table/Fig-6]: Feedback of high school children regarding jigsaw reading technique.

Parameters	No. of high school children	Mean reading skill score	t-value	p-value
Age (Years)				
13-14	28 (93.3%)	12.08±3.27	1.15	0.25 NS
15-16	2 (6.7%)	13.57±1.39		
Gender				
Male	7 (23.3%)	12.21±3.20	0.71	0.48 NS
Female	23 (76.7%)	13.14±2.19		

[Table/Fig-7]: Association of reading skill score among high school students of the experimental group. n=30. NS: Non significant (p>0.05)

Parameters	No. of high school children	Mean reading skill score	t-value	p-value
Age (Years)				
13-14	23 (76.7%)	2.35±1.72	0.11	0.90 NS
15-16	7 (23.3%)	2.50±0.70		
Gender				
Male	23 (76.7%)	2.28±1.49	0.14	0.88 NS
Female	7 (23.3%)	2.39±1.75		

[Table/Fig-8]: Association of reading skill score among high school students of the control group. NS: Non significant (p>0.05)

in the first grade of senior high school. The sampling technique is a quasi-experimental research design that includes a pre-test, treatment, and post-test. The sample size is 35 students taken as purposive sampling. This research used the quantitative research method. The research is divided into two parts, one is the experimental group and the other is the control group. The researcher used jigsaw II as an independent variable which was analysed by using SPSS 17.0. The result of the learning process of the jigsaw II method in the experimental group is better compared with the result of the control group [9].

A study was conducted by Yuhananik Y to improve reading comprehension using the jigsaw model of comparative learning in reading classes. This study used an action class research design. The population of the study is ninth-graders of SMPN 1 Karan Gaplosomalang. The sample size was 30 students. The students

were low in English subject. The study reveals that the jigsaw model of cooperatives learning in teaching reading is effective to increase reading comprehension. The record of comparative showed an increase in the first, second, and third test. The average score before jigsaw was 6.08. All student has actively participated in last stage jigsaw reading [10].

Implications

For nursing administration: The administration should concentrate on the selection of the teaching methods for nursing students in all areas like the creativity room, encouraging and providing facilities and classrooms to perform their activity. The study will help the nursing administrator to plan and organize continuing education for nurses, nursing students regarding improving reading skills with the help of the jigsaw technique. This study is not only used in nursing, but can be used in all disciplines of education for the improvement for students.

For Nursing education: The nursing students will develop knowledge regarding how to improve their reading skills. This will help the student in improving knowledge to ideas, thought and information. It is puzzled based learning.

Scope of the study: This study can use on a larger sample, for the difficult subject of nursing and can increase the motivation for teamwork.

Limitation(s)

The limitations of the present study are, limited to 9th standards. The study did not have large sample.

CONCLUSION(S)

The current study concludes that the control group of high school children is not having proper reading skills and the assessment of the jigsaw reading technique in improving reading skills among high school children is effective.

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ANNEXURE-VII STRUCTURED QUESTIONNAIRE

Instructions: - Sample No.....

- The information will be kept confidential
- Read each item carefully and tick the most appropriate answer
- Avoid overwriting, tick only one option for each question
- Attempt all questions.

SECTION: A

Demographic Data

1. Age _____ (In years)
 - a) 11-12 years b) 13-14 years c) 15-16 years
2. Gender _____
 - a) Male b) Female

SECTION: B

Sl. No.	Questions	YES	NO
A.	Skimming:		
	Whether the reading was fluent.		
	Did the students are taking a pause when there is a full stop?		
	Did the students follow all punctuation marks while reading?		
B.	Scanning:		
	Whether the reading pronunciation was clear.		
	Did the students read full-sentence continuously?		
	Did the students read the text accurately?		
C.	Awareness about Synonyms and Antonyms:		
	Did the students find out the synonyms and antonyms from the text?		
	Did the students able to answer the synonyms and antonyms of the given word.		
	Whether the students are confused about the synonyms and antonyms.*		
D.	Deduce Meaning of Unfamiliar Words from the Text:		
	Did the student can find out the unfamiliar word from the text.		
	Whether the students can answer the multiple-choice question quickly.		
	Did the students can choose the correct alternative to answer the question.		
E.	Infer Mood and Author's Attitude or Tone:		
	Whether the students are interested while reading.		
	Did the students are using appropriate tone while reading?		
	Did the students are reading with a positive attitude?		

SECTION: C

Sr. No.	Questions	Strongly disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly agree 5
1.	Do you think the jigsaw method helps in improving the reading skills of children?					
2.	Do you think working in a group puts less pressure on individual reading?					
3.	Do you think this jigsaw method can be used in the teaching activity?					
4.	Do you think it helps to increase the level of confidence?					
5.	Do you feel the conducting atmosphere was good?					
6.	Do you feel it make group co-ordination?					
7.	Do you think it improves the student's ability to read fluently?					
8.	Do you think this method is helpful to concentrate?					
9.	Do you think this method was understandable?					
10.	Do you feel it enable the learner to help weaker learners in the group?					
11.	Do you think it stimulates critical thinking?					
12.	Do you think it helps the learner to actively participate in the learning process?					
13.	Do you feel this is an effective method for training and personal development?					
14.	Do you get a positive experience with this learning method?					
15.	Do you feel comfortable using this learning method in your practices?					
16.	Do you satisfied with this learning method.					
17.	Do you think it helps to improve the status of knowledge?					
18.	Do you think reading is the most important skill to touch the world around you?					
19.	Do you think it helps to enhance problem-solving skills?					
20.	Do you think the time for the class was sufficient?					