



Pelagia Research Library

European Journal of Experimental Biology, 2012, 2 (5):1646-1653



The effect of traditional & integration methods of teaching on the amount of learning Math & sport performance of first grade of elementary students

Fahiminezhad A.¹, Mozafari S. A. A.², Sabaghiyanrad L.¹ and Esmaeili M. R.³

¹Science & Research Branch, Islamic Azad University, Tehran, Iran

²Department of Physical Education and Sport Sciences, Tarbiat Moalem University, Tehran, Iran

³Islamic Azad University, Central Tehran branch, Tehran, Iran

ABSTRACT

The major aim of this study was to compare the effect of both traditional and integration method of teaching on the amount of learning Math & sport performance in male students of first grade in elementary schools. Also, physical fitness factors of the students were compared in two groups of students based on two methods. It was a semi-experimental Research which was conducted in city of Sabzevar during three months by participation of traditional and integration groups. Statistical population & sample were students who finished pre-schools in Sabzevar city at the end of academic year 2010-2011. Seventy three students agreed to take in IQ test. Among them, thirty ones who had close IQ score, were chosen and divided into two groups of traditional (15) & integration (15) randomly. Two teachers of first grade and physical education were selected for both groups. The traditional group was taught Math lesson, five sessions of forty five min & Physical education lesson two sessions of forty five min a week during twelve weeks while the lessons taught separately. Also, integration group were taught Math composed with physical activities during twelve weeks and "Math- physical education" seven sessions a week, each session duration forty five min. The data was analyzed using Wilcoxon, Mann Whitney tests, dependent & independent t tests. The results revealed that there was a meaningful difference between the amount of learning Math & Physical education in traditional & integration groups at the level $\alpha < 0.05$. The dependent t results revealed that there was a meaningful difference among the average of four physical fitness factors in traditional group's pre & posttests at the level $\alpha < 0.05$. Also, there was a meaningful difference between the integration group's four factors of physical fitness (Cardio-respiratory endurance, flexibility, speed & balance) in both pre and post-tests at the level $\alpha < 0.05$. The independent t result show that there was a meaningful difference among four factors of physical fitness in both traditional and integration groups at the level $\alpha < 0.05$.

Key words: Traditional Teaching- Integration Teaching- Learning- Math - Sport Performance

INTRODUCTION

In any education system, the role of education is to transfer knowledge and value system from one generation to the other, and educational institutes are an important tool for achieving social goals. Meanwhile, one of the most essential academic periods is the primary stage, for much of the personality formation and all-inclusive development

of a child takes place during this period. For that reason most advanced countries have directed their efforts toward education of children at this period [1].

On the other hand, in an ever-changing environment of global competition the educational community is responsible to improve the future of students that mainly depends on different teaching methods within the education system [2]. Many studies have been carried out to examine teaching methodologies in schools and their effect on learning course materials. Some of these studies that dealt with traditional methods (separate teaching of different courses) in the education system came to the conclusion that traditional methods have many shortcomings and flaws [3 & 4]. The traditional approach to teaching fails in knowledge transfer and transfer of power from the teacher (teacher-centered) to students (student-centered), and the students are unable to move the knowledge they have acquired in the school to outside the classroom [5]. Moreover, traditional approaches cannot create a link between the syllabi, the real world, and learning [6].

Therefore, some researchers tried to identify and introduce other teaching methods that would help in removing the shortcomings of the education system. With much research in this area, they suggested an integrative teaching method that could be practiced in different ways depending on the conditions of the learners and the learning environment [2 & 7] and its application proved to be more effective than traditional approaches for teaching students, especially before senior high school (due to the specific characteristics of children) [8 & 9].

According to the studies carried out in this area, integration is one of the most interesting discussions in designing the syllabus and it is considered as a way of actual learning by removing the arbitrary boundaries between course topics and creating a connection between the meaningful materials, concepts, and skills; integration is the opposite of discrete, content-oriented syllabi [4]. Further, integrative organization of the syllabi prepares the ground for students to achieve unity and integrity in learning experiences and it leads to meaningful learning [10].

Integrative syllabi are more interesting, stimulating, and helpful for students than traditional syllabi [6, 9, & 11] and they can foster thinking and learning in students [9-18]. Some other researchers believed that this method may or may not lead to learning in students [19]. However, in comparison with students under a traditional approach, students who participated in an integrative program had a better performance [12], greater participation [20], and better practical understanding of the syllabus [21]. So far, researchers have come to believe in the efficiency of integrative teaching and by applying this method in schools they have managed to revolutionize teaching—especially by integrating the course of physical education with other courses- and have met the educational needs of learners [22].

Integrative physical education was introduced in the schools and education systems around the world in the early twentieth century, and recently most countries have paid special attention to this program, particularly in primary schools [3]. There has also been a body of research on integration of physical education with other courses, showing that physical education has the potential of being integrated with other course and hardly any course can be found that cannot, in part or as a whole, be combined with physical education or be taught in the same manner [22 & 23]. Most studies have concluded that this method encourages and motivates learners and leads to more effective learning [6, 15, 16, 17, 18, 22, 24 & 25], less absenteeism and more active presence in the classroom [2 & 16], improved physical well-being and increased physical activity [20], and the ability to put to use what has been learned [26].

In addition, integrating physical education into other course can result in more accurate and desirable feedbacks and can motivate students with different interests [24]. These advantages distinguish integrative teaching from traditional approaches, especially if it involves integration of physical education into other courses. Despite the problems of traditional teaching and the advantages of the integrative method, and in the face of the fact that primary schools are the central axis of development of society, there is still dissent among researchers regarding whether teaching with no boundaries between course topics has any effect on learning and whether there is a difference between traditional teaching theoretical courses and physical education and integrative teaching of these courses at primary schools. The effect of traditional and integrative teaching methods on certain physical fitness factors (cardiorespiratory endurance, flexibility, speed, and balance) is also a matter of debate.

Therefore, it is imperative to carry out a research and examine the effectiveness of integrative teaching on learning (in the case of the present research mathematics) and the performance of primary grade students and to compare the

results with those of traditional teaching. The findings of such a research can encourage administrators and planners in the Ministry of Education to make fundamental changes in teaching methods at primary schools and to some extent at junior and senior high schools in order to achieve its goals and missions. Performing physical activities while learning theoretical courses in an integrative fashion creates variety and is in keeping with the characteristics of children at primary school years, and it also improves their physical health. Moreover, high flexibility in designing integrative courses can help teachers to take into account the ability and interest of students as well as available facilities in order to better achieve their goals. Additionally, integrative teaching is not merely limited to education and it can lead to creativity and change in the specialized courses of the field of physical education in universities.

MATERIALS AND METHODS

The present research was quasi-experimental using final examination as post-test after a three-month period of teaching to a traditional group and an integrative group. The population consisted of the students studying at the period 2010-2011. Some of the students' parents were negotiated with regarding the research and its advantages. The students were to attend an extracurricular course (either traditional or integrative) during the summer of 2010. A total of 73 students volunteered and participated in Stuart's IQ Test. After that, 30 students with similar IQs were selected and randomly divided into a traditional and an integrative group.

After verifying the health of the subjects by a physician, the fundamental skills of the physical education course and four physical fitness components were pretested. A single first grade teacher was selected for both groups. The teacher instructed each group every other day. During a period of 12 weeks, the traditional group separately participated in the mathematics course (5 times a week and 45 minutes per session) and the physical education course (2 times a week and 45 minutes per session) in accordance with the syllabus approved by the Ministry of Education. Since in the integrative group the physical activities were incorporated into the mathematics course, the 2 sessions of physical education instruction was integrated into the 5 sessions of mathematics course. Therefore, the integrative group was instructed for 12 weeks, 7 sessions a week, and 45 minutes per session.

By the end of the course, both groups took the post-test to evaluate their learning of mathematics and their progress in fundamental skills as well as the four physical fitness components. Due to the lack of approved tests for first grader students, a 20-question written test was used which was developed by the teacher in order to evaluate the learning of mathematics concepts. To determine the validity of the course, indices, and tests, some professors specialized in the area of integration and physical education presented their opinion about their validity. Then, some of the opinions and suggestions that were constructive in making the courses, indices, and exams were taken into account in the final version of them.

The fundamental skills of physical education (walking, running, turning, downward single-handed throw, upward single-handed throw, and two-handed throw) were selected by the common physical education teachers for the pretest and the post-test using the checklists in Physical Education Teaching Handbook [28 & 29] as well as the indices in Descriptive Evaluation Handbook [30] which are developed by the Ministry of Education. Moreover, the physical fitness factors including cardiorespiratory endurance, flexibility, speed, and balance were evaluated in the pretest and the post-test by 20-meter shuttle run test, modified sit and reach test, 30-meter run, and single-leg standing respectively. The mathematics exam and fundamental skills of physical education were scored based on the Act of Academic Progress Evaluation approved in the 769th session of Iran's Supreme Council of Education. Accordingly, four ordinal scales—"very good", "good", "acceptable", and "requiring more practice"—were used to assign each student a rank proportionate to their performance.

The data was analyzed using descriptive statistics and Wilcoxon sign-ranked test, Mann-Whitney U test, correlated t-test, and independent t-test were applied for hypothesis testing.

RESULTS AND DISCUSSION

The IQ of the subjects

Considering the statistics in table 1, since the subjects were selected from those students with roughly similar IQs, there isn't a significant difference between the traditional group and the integrative group in the level of IQ.

Table 1: Distribution of The IQ of the subjects

Teaching Method	N	Mean	Std.	Lower	Upper	t	df	Sig (2-tailed)
Traditional	15	115.86	2.56	111	119	0.556	28	0.582
Integrative	15	115.33	2.69	111	119			

P<0.05

The effect of traditional and integrative teaching methods on learning mathematics

Table 2: Mean differences of Ranks in traditional and integrative teaching methods

Teaching Method	Mean	Z	Sig (1-tailed)
Traditional	00/2	-3.334*	0.001
Integrative	33/3		

**P*<0.05

Considering the data in table 2, the z-score calculated using the non-parametric Mann-Whitney U test was significant at *P*<0.05. Thus the mean of the integrative group were significantly higher than the traditional group. Learning math more effectively happened in the integrative group than the traditional group.

The effect of traditional and integrative teaching Methods on learning the fundamental skills

Table 3: Rank Mean differences of the pretest and post-test in traditional teaching

Teaching Method	Mean	Z	Sig (2-tailed)
Traditional	pretest	1.00	-3.448*
	post-test	2.20	
Integrative	pretest	1.00	-3.460*
	post-test	3.20	

**P*<0.05

According to table 3, the z-score calculated using Wilcoxon sign-ranked test was significant at *P*< 0.05. In other words, traditional and integrative teachings improve learning of the fundamental skills of the physical education course, since the pretest and post-test means of the two groups significantly differed.

The effect traditional and integrative teaching methods on learning the fundamental skills

Table 4: Rank Mean differences of the fundamental skills in the traditional and integrative teachings

Teaching Method	Mean	Z	Sig (2-tailed)
Traditional	20/2	-3.260*	0.001
Integrative	33/3		

**P*<0.05

Considering the data in table 4, the z-score calculated using Mann-Whitney U test was significant at *P*<0.05. Thus, the mean of the integrative group were significantly higher than the traditional group. Learning of the fundamental skills more effectively happened in the integrative group than the traditional group.

The effect of traditional teaching Method on the four physical fitness factors

Table 5: Mean differences of the pretest and post-test in traditional teaching method

The physical fitness factors	Test	Mean	Std.	t	df	Sig (2-tailed)
Cardiorespiratory Endurance ml/(kg. min)	pretest	61.28	1.02	-4.583*	14	0.001
	post-test	62.51	1.05			
Flexibility (CM)	pretest	21.11	0.83	-4.220*	14	0.001
	post-test	21.35	0.85			
Speed (S)	pretest	9.31	0.43	3.603*	14	0.003
	post-test	9.13	0.36			
Balance (S)	pretest	24.87	6.23	-2.964*	14	0.010
	post-test	25.13	6.39			

**P*<0.05

Considering table 5, the level of correlated t for comparing the pretest and post-test mean of the traditional group in physical fitness factors was significant at $P < 0.05$.

The effect of integrative teaching Method on the four physical fitness factors

Table 6: Mean differences of the pretest and post-test in integrative teaching

The physical fitness factors	Test	Mean	St d.	t	df	Sig (2-tailed)
Cardiorespiratory Endurance ml/(kg. min)	pretest	61.56	0.99	-11.178*	14	0.001
	post-test	64.03	0.73			
Flexibility (CM)	pretest	21.25	0.74	-8.028*	14	0.01
	post-test	23.29	0.99			
Speed (S)	pretest	9.39	0.50	9.006*	14	0.001
	post-test	8.57	0.38			
Balance (S)	pretest	23.11	5.48	-7.453*	14	0.001
	post-test	31.33	8.30			

* $P < 0.05$

Considering table 6, the level of correlated t for comparing the pretest and post-test mean of the integrative group in physical fitness factors was significant at $P < 0.05$.

The effect of traditional and integrative teaching methods on the four physical fitness factors

Table 7: Mean differences of the four physical fitness factors in the traditional and integrative teachings

The physical fitness factors	Test	Mean	Std.	t	df	Sig (2-tailed)
Cardiorespiratory Endurance ml/(kg. min)	traditional	62.51	1.05	-4.578	28	0.001
	integrative	64.03	0.73			
Flexibility (CM)	traditional	21.35	0.85	-5.708	28	0.001
	integrative	23.29	0.99			
Speed (S)	traditional	9.13	0.36	4.162	28	0.001
	integrative	8.57	0.38			
Balance (S)	traditional	25.13	6.39	-2.296	28	0.029
	integrative	31.33	8.30			

* $P < 0.05$

Considering table 7, the level of correlated t for comparing the mean of the traditional and integrative group in physical fitness factors was significant at $P < 0.05$.

DISCUSSION AND CONCLUSION

The concepts of different fields of human knowledge are usually compiled and organized within separate course books. But in the face of a real-life, multi-dimensional problem or situation, we tend to disregard the applicable aspect of learning for students and instead underlie the preservation of traditional methods.

The integrative teaching method can transfer to students the knowledge, skill, and outlook they need for living an effective, active, balanced, and rational life. Pestalozzi (1798) emphasized that students learn scientific fields better when they are taught simultaneously. In curricula where course topics have been integrated, the external boundaries of human knowledge are blurred and the unity required for a more actual understanding of social and human problems will be achieved [10].

The main purpose of the present research was to examine the advantages of integrative teaching method using theoretical discussions and implementing them. Thus, the present research compared the traditional and the integrative teaching method in terms of learning mathematics and physical performance of first grade students. Examining the learning of mathematics through traditional and integrative teaching, the results show that there was a significant difference between the mean scores of the integrative group (3.33) and the traditional group (2.00). The course of mathematics and its related concepts are quite difficult for students at different academic levels and these students do not show much enthusiasm and motivation for learning them. Especially if the teaching occurs in the classroom where the child is not allowed to be active, the link between mathematics and other courses and its application in real life cannot be established. However, integrating fundamental motor activities into this course may

satisfy the need of students for movement and playing, and create in them the required motivation and enthusiasm for learning and understanding mathematics [3 & 18]. Considering the findings of the present research as well as the literature, it seems that using the integrative teaching method for mathematics course at first grade primary school and incorporating motor activities into the course can improve learning as compared to traditional separate teaching of the course of mathematics. Thus, the integrative method can be more effective for students [6, 9, & 11] and will foster learning in them [9-18].

Since in the present research learning mathematics was evaluated in conjunction with motor activities and fundamental skills that are part of the first grade course of physical education. The fundamental skills were again separately examined and compared for each group. The pretest and post-test scores of the traditional group in the fundamental skills of physical education (i.e. walking, running, downward single-handed throw, upward single-handed throw, and two-handed throw) were compared and the results indicated a significant difference in the mean post-test score (2.20) in comparison with the pretest (1.00). Also a comparison was made between the pretest and post-test scores of the integrative group in terms of fundamental skills of physical education and the results showed a significant difference between the mean post-test score (3.02) and the mean pretest score (1.00) of this group. The above findings suggest that both traditional and integrative teaching methods can improve learning of the fundamental skills, but there is a significant difference between the mean post-test score of the integrative group (3.20) and the traditional group (2.20). Thus, using the integrative method has a greater effect on learning the fundamental skills than the traditional method (separate teaching of each course). Although the course of physical education is interesting for most students, it is the teaching method that can have a greater effect on learning the mentioned skills. Since the main purpose of the present research is to integrate motor activities into the mathematics course, the results support the notion that physical education can be integrated into other courses [22 & 23]. The results of the present research and the previous studies have shown that subjects who participated in an integrative program demonstrated better learning than those who were taught each course separately (traditionally) [6, 16, 17, 18, 22, 24, & 25]. The integrative method also leads to better performance of the subjects [12].

Furthermore, the present research also examined four physical fitness factors, i.e. cardiorespiratory endurance, flexibility, speed, and balance, in both the traditional and the integrative group with a pretest-posttest design and the results are as follows: in the traditional group, significant differences were observed between the pretest (61.28 ± 1.02) and post-test (62.51 ± 1.05) score of cardiorespiratory endurance, between the pretest (22.11 ± 0.83) and post-test (21.35 ± 0.85) score of flexibility, between the pretest (9.31 ± 0.43) and post-test (9.13 ± 0.36) score of speed, and between the pretest (24.87 ± 6.23) and post-test (25.13 ± 6.39) score of balance. The differences illustrate the effectiveness of traditional teaching method for the physical fitness factors. In the integrative group on the other hand, significant differences were observed between the pretest (61.56 ± 0.99) and post-test (64.03 ± 0.73) score of cardiorespiratory endurance, between the pretest (9.39 ± 0.50) and post-test (8.57 ± 0.38) score of speed, and between the pretest (23.11 ± 5.48) and post-test (31.33 ± 8.30) score of balance. These differences signify that the integrative teaching method is also effective for improving the four physical fitness factors. Then, comparing the scores of the two groups revealed that there are significant differences between the mean cardiorespiratory score of the traditional group (62.51 ± 1.05) and the integrative group (64.03 ± 0.73), between the mean flexibility score of the traditional group (21.35 ± 0.85) and the integrative group (23.29 ± 0.99), between the mean speed score of the traditional group (9.13 ± 0.36) and the integrative group (8.57 ± 0.38), and between the mean balance score of the traditional group (25.13 ± 6.39) and the integrative group (31.33 ± 8.30). The findings of the present research as well as the literature suggest that integration of physical activities into the course of mathematics not only leads to better and more effective learning of the course in comparison with the traditional method, but also encourages students to be more active [2, 17, 18, & 20] and subsequently increases their cardiorespiratory endurance, flexibility, speed, and balance. Moreover, since incorporation of physical activities into the course of mathematics was effective for the physical fitness factors of the students, this method can result in physical health of the subjects in the long term [18 & 20]. These useful, persistent effects can also lead to positive consequences for the society at the macro level (including economic, social, cultural, and political aspects).

CONCLUSION

Thus, the results of the present research indicated the significant effect of integrative teaching on learning mathematics and physical education, increasing knowledge acquisition, increasing the scores of the subjects, and their progress in the four physical fitness factors. The results also lay the ground for future studies. It is

recommended that administrators and planners in the Ministry of Education and the Ministry of Science, Research, and Technology replace traditional methods with novel ones, especially integrative teaching of different courses along with physical activities. Also the officials of educational planning can pay more attention to this issue by providing teachers and researchers with the necessary facilities for research in this area and to present the results to managers, teachers, and the general public so as to introduce them with the advantages of integrative teaching (especially with physical activities) and to encourage them to wholeheartedly support this cause.

Acknowledgements

This study was carried out with the grant of Islamic Azad University, science and research branch, Tehran, Iran.

REFERENCES

- [1] Safi, A., (2009). Education in elementary, junior high school, and senior high school levels. 10th Edition, Tehran: SAMT Publications.
- [2] Ahmadi, P., (2001). Design of an integrative syllabus and its comparison with the existing syllabi at the elementary level. Doctorate Dissertation, Tarbiat Modares University, Tehran.
- [3] Placek, J.H. & Sullivan, O.M., (1997). The Many Face of Integrated Physical Education. JOPERD. VOL: 68. NO: 1.
- [4] Maleki, H., (2003). An integrative approach to syllabi. Parents and Coaches Association Press, Tehran.
- [5] Eggebrecht, J., (1996). Reconnecting with the Society. Educational Leadership. 53(8).
- [6] Findley, N. J., (2000). Making Connections: A Case Study of Fifth-Grade Learning from Two Different Organizations of Curriculum Integration. Dissertation, Bell & Howell Information and Learning Company.
- [7] Maleki, H., (1994). A theoretical framework for organization of course content with an emphasis on the syllabi of social studies. Doctorate Dissertation, Tarbiat Moalem University, Tehran.
- [8] Moafi, M., Maleki, H., (1996). Integration of the syllabi of history, geography, and social studies courses: Principles and methods. Institute of Education.
- [9] Weilbacher, G. A., (2000). Why Teachers Decide to use, Then not Use, Curriculum Integration as Their Curriculum Planning Philosophy. University of Wisconsin-Madison
- [10] Jafari, H., Ghorbani, N., (2008). The effect of integrating the content of four main chapters of Basic Science course book on the academic progress and social growth of female first grade junior high school students. Journal of Educational Innovations, No. 28.
- [11] Zemelman, S., Daniels, H. & Hyde, A., (2005). Best Practice: New Standards for Teaching and Learning in America's School. 3rd Edition, Portsmouth, NH: Heinemann.
- [12] Vars, G. F., (1991). Integrated Curriculum in Historical Perspective. Educational Leadership, VOL: 49, NO: 2, 14-15.
- [13] Drake, S. M., (1993). Planning Integrated Curriculum, the Call to Adventure. ASCD.
- [14] Halbach, A., (2000). Promise and Practice of Curriculum Integration in a Middle School. Dissertation, the University of Wisconsin, Milwaukee.
- [15] Soleimani, T., (2008). The role of integration in the curriculum of first grade elementary schools: A model for formulating the syllabi based on the integrative approach. Doctorate Dissertation, Tehran Science and Research Branch, Islamic Azad University.
- [16] Housner, L.D., (2009). Integrated Physical Education: A Guide for The Elementary Classroom Teacher. West Virginia University (2ndED.).
- [17] Marx, A.C., (2009). An Interdisciplinary Approach to Physical Education & Sport: an in Class Activity (teaching tips). JOPERD
- [18] Mirascieva, S., (2010). The Integrated Access in the Preparation and Planning of the Teaching Process at the Primary Schools in Republic of Macedonia. Procedia Social and Behavioral Sciences, VOL: 2, 5059- 5065.
- [19] Katlin, R. & at el, (1992). Integration from the Student Perspective: Constructing Meaning. Center of the Learning and Teaching of Elementary Subjects.
- [20] Erwin, H.E., Abel, M.G., Beighle, A. and Beets, W.M., (2009). Promoting Children's Health through Physically Active Math Classes: A Pilot Study. Pub: Health Promotion Practice
- [21] Brayan, J. A. & Fennell B. D., (2009). A Lesson Illustrating the Integration of Mathematics, Science and Technology through Multiple Representations. Department of Physics and Astronomy. Ball State University. USA.
- [22] Mozafari, A.A., (2001). Integration of physical education into different courses. Danshevar Journal, 338:65-70.

-
- [23] Placek, J.H., (1996). Annotated Bibliography grades K-3. In L. T. Lambert & R. T. Trimble (Eds), Basic Stuff in Action Grades 4-8. Reston, VA: American Alliance for Health, Physical Education, Recreation and Dance, (pp. 180-183).
- [24] Placek, J.H., (1995). Annotated Bibliography grades K-3. In E. S. Bressan (Ed), Basic Stuff in Action Grades K-3. Reston, VA: American Alliance for Health, Physical Education, Recreation and Dance, (pp. 121-123).
- [25] Rauschenbach, J., (1996). Tying It All Together Integrating Physical Education & other Subject Areas. JPOERD, VOL: 67, NO: 2.
- [26] Sadeghi, R., Doosti, M., (2009). Integration of physical education and physics. Journal of Educational Technology, 4:28.
- [27] Sharifi, H.P., (2003). Personality Evaluation (Psychology). 6th Edition, Payame Noor University, Tehran.
- [28] Best, J.W., Research in Education. Translated by Sharifi and Taleghani, SAMT Publications.
- [29] Zolfaghari, H., Sangari, M.R., Abdurrahman, M., Omrani, G.R., Farhadi, G., Fa'al, A., (2002). First grade math book. 1st Edition, Department of Publishing and Distributing Textbooks, Tehran.
- [30] Mirsistani, A.A., Shahrokhi, H., Na'imi, Z., Soltani, S., Nemati, T., Asgharzadeh, G., (2010). Physical education teacher's office (elementary level). 1st Edition, Department of Education, Khorasan Province.