

# Comparison of attitude towards creativity, academic performance and learning speed of students in smart and ordinary schools

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## ABSTRACT

**Objective:** The purpose of this study was to compare attitude toward creativity, academic performance and learning speed of students in smart and ordinary schools. **Method:** This study was a causal-comparative study. The study population included all male primary school pupils studying in the 2015-2016 school year, Borujerd, with a total of 2109 students (1113 students in smart schools and 996 students in ordinary schools). Based on previous research and authoritative research papers, 100 students (50 smart and 50 normal school students) were selected and studied as sample groups by using randomized sampling method. The questionnaire of attitude towards creativity, Speed of Learning Questionnaire, and GPA of the last half-year of students were used to measure variables and data were analyzed using statistical methods of Yuman-Whitney statistical test. **Results:** The results indicated that there was a significant difference between the attitude toward creativity, academic performance and learning speed of students in smart and normal schools, in favor of smart schools students. **Objective:** Based on the research findings, it has been concluded that school intelligence plays an important role in attitude toward creativity, academic performance and student learning speed.

**Keywords:** academic performance, creativity, learning speed, smart and ordinary schools.

## Introduction

Education in high school comes with maturity. The puberty or early adolescence is a time of rapid physical, emotional, and rational growth, while the middle age of adolescence is associated with greater consistency and changes in development move toward the personality integrity. The period of boys' adolescence is not the same from the perspective of psychologists, biologists and sociologists, but most scholars have declared this period between twelve to seventeen or eighteen, so that students of the guidance and high schools are in this age group. The changes in adolescents' age and the developmental

characteristics of adolescents, especially male students, are influential on curriculum decisions, teaching, and school structure. Disregard for adolescent's needs can make this course a risky period for many of them, because the adolescent person for the first time takes actions or decisions that can have long-term consequences in his life. The specialization age of the adolescent brain is approximately 12 to 18 years of age. Parts of which are heavily used, grow and parts that are not used, are removed. When the brain of adolescent students becomes more specialized, curriculum planning should provide the ability to develop the skills of adolescent students by providing a diverse range of learning experiences<sup>[1]</sup>.

As stated, high school adolescent students, especially male adolescent students, need to have appropriate facilities in the educational environment, in order to be more interested in learning and appropriate learning. Today, the most important concern of the educational system of a country is to create an appropriate environment for the growth and excellence of intellectual capitals in the smart and knowledge-based society. In order for all social groups to be able to participate effectively in such a society, they must learn continuous learning, creativity, innovation, as well as active and constructive social

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participation. The realization of this, requires a redefinition of the role and function of schools as the main educational institutions in the community [2].

The emergence of new phenomena and inventions in every era has affected all aspects of human life (economic, social, and cultural). In the present time, with the advent and development of information technology and communication, the world developments focused on information is expanding rapidly. Schools are one of the areas that have changed with the advent of technology. The emergence of schools in this field can be considered as one of the symbols of the presence of technology in the field of education. In fact, in these schools, learning is based on individual speed, participatory effort, autonomy, continuity between the course subjects, and the content of the lesson is not limited to printed books, but also includes electronic books, multimedia software, coursewares and databases. At the same time, there are plans for each student's individual differences and learning styles [3].

The Smart School curriculum is designed to allow students to achieve the desired educational progress during a particular period. Students can also learn the knowledge, skills, values and principles and the proper use of language-related applications in conjunction with the curriculum. The learning outcomes that we need to achieve within a specific time period are included in the Smart School curriculum so that all students progress at one level and with each other. The learning process in smart schools includes goals such as dynamic learning, in which the learner himself makes the meaning of learning [4].

The assessment in smart schools has been generally considered because it must be considered as a complete package of achievement, preparation, progress, and attitude. Achievement means achieving the desired result in education and show us whether the student is ready to enter the next stage or not. Preparation means having different experiences in the field of learning content. Progress means a step forward to achieve the desired educational goals. Weaknesses and strengths of students should also be considered at this stage. Educational assessment in smart schools is very different from ordinary schools, because in these schools, with the use of smart school equipments such as smart board and data projector and the online internet network educational methods have been very different. Also, with Paying attention to its comprehensiveness, it's the best way to achieve progress and new developments. It would definitely be said that the most important measure of development and progress, especially in today's world, is technology, and education is a means of familiarizing and acquiring new technologies [5].

One of the psychological characteristics of adolescent students who can be influenced by school intelligence and made their differences with students attending ordinary schools, is their attitude toward creativity. Creativity is the individual's ability to create innovative theories, insights, or new objects in science and other fields that are regarded by scholars as authentic, scientific, aesthetics, technology, and social. Creativity is not intrinsic but can be taught. Through teaching, children can be

taught to think through unusual ways, and through divergent thinking to address problems and find suitable solutions [6].

Smart schools can be effective in eliminating or reducing the educational gap due to flexible curriculum, the possibility of teaching with new methods of teaching a broad range of programs and methods, and focusing on the role of the student, taking into account individual differences and more attention to needs, interests and talents in students. The future intelligence community needs people who can innovate information technology for growth and development. In this age, the lack of knowledge, insight and modern skills leads to unemployment, social inequality and as a result of dissatisfaction and tension, and therefore, in this period more than any other time, human societies need human development [7].

In addition to attitudes toward creativity, another psychological characteristic of adolescent students that can be influenced by school intelligence and their differences with students attending ordinary schools is their academic performance. Academic performance is one of the structures that has long been considered by practitioners and has attracted many researches. Education professionals have always tried to provide the conditions for the learners to have the most educational excellence. Today, one of the functions of educational collections is to help learners in academic performance. One of the important goals of educational systems in the world is to create better academic performance. Everyone is trying to identify the factors affecting academic performance in learners and guide each of the factors so that learners can grow and learn more. In short, the term "academic performance" refers to the amount of individual school learning that is measured by the teacher and different tests for all subjects [8].

The major changes brought about by information technology in smart schools are the source of fundamental changes in the classroom, the most important of them is the fact that technology has enabled students to access out-of-class information, which causes increase their motivation for learning and academic performance (Shellter, 2014 ; quoted by Taylor, 2014) [9].

By utilizing information technology, teachers easily access new resources for their education and provide their classroom information and materials faster and easier [3]. Also, students 'attitudes toward the use of information technology are considered to be effective factors. In other words, understanding students' attitudes toward e-learning can lead to a better learning environment for students [10].

Also, the learning speed as a psychological feature in adolescent students can be influenced by the intelligence of schools and their differences with students attending ordinary schools, Widespread use of new technology for facilitating and speeding the instructional-learning process of students and teachers can be mentioned as one of the smart school aspects [11].

Several research suggests that the use of technology in education reduces the cost of education, creativity, time saving and learning speed, increasing instructional-learning opportunities, increasing academic performance, and providing quick access to information. For this reason, politicians in the education center

have shown special attention to e-learning in many developing countries, including Iran <sup>[12]</sup>.

One of the most important features of smart schools is that students use their abilities with independent thinking and creativity, and the dominant environment makes use of the abilities of instructors, teachers and parents to strengthen education and the school environment provides learning background and motivation for students. Smart Schools in addition to increasing the efficiency of classes, using educational clips and various software helps student learning, because in addition to the auditory dimension, the visual aspect also helps to better learning. Students in the Smart School take on the role of learner and teacher. In this school, the curriculum is not limiting and students are allowed to go beyond their curriculum. In this school, the method of teaching is based on student orientation. Emphasizing the skill of thinking and providing instructional-learning environments is one of the strategies of the smart school <sup>[13]</sup>. Studies show that instruction is organized by the smart board is effective on the level of grammar and structure of English sentences instruction, increasing the level of understanding and comprehension of students from English content, learning English vocabulary and terminology, improving English writing skills, and in cooperative learning of second language teaching and using the smart board with cooperative learning method is the way to learn better English course in all the basics and middle and high schools and even university. Also, the teaching patterns along with the smart board of the research should be done with attention to the students' talent and separate program for teaching <sup>[14]</sup>.

According to the mentioned points, the main issue of the present research is whether there is a difference between attitudes toward creativity, academic performance and learning speed of first-grade high school boy students in smart school and ordinary schools?

## Research design

The research method of the present study is of a causal-comparative type. In a causal-comparative study, the goal is the researcher come from effect or a variable dependent to probable cause (independent variable), and so the study is retrospective. This research design is used when the independent variable is unmanageable due to its specificity or immortality and inhumanity, and the researcher wants to achieve the effective independent variables through studying dependent variable <sup>[15]</sup>.

### Subjects

The statistical population of this study includes all first year high school boy students who studied in the academic year 2016-2017 in Borujerd, according to the data of Boroujerd education, their total number is 2109 people. Of these, 1113 students are in smart schools and 996 students study in ordinary schools. In the present study, 100 people (50 students of smart schools And 50 ordinary school students) were selected by random sampling method as sample, using research activities in this

regardand the authoritative research methodology books <sup>[16]</sup>, and the opinion of the suoervisor and advisor.

### Instruments

The first instrument, the scale of attitude towards creativity

#### a. Introducing the instruments

The Attitude to Creativity Questionnaire was designed by Charles Lee Schifer (1989), a professor at Fordham University in the United States, and translated by Karami (2008), a faculty member at Allameh Tabataba'i University, which contains 32 terms, each student agrees or opposes with them. Questions of attitude towards creativity based on literature review, special attitudes, beliefs and values of individuals with high creativity. 2 of 32 questionnaires on attitude towards creativity (questions 3 and 14) are a part of filling questions and designed to reduce the discovery of the instrument nature. The other 30 questions consisted of measuring the following dimensions in relation to creative progress.

- A. Confidence in your beliefs (11 questions: 2-7-9-11-15-17-18-20-26-27-28)
- B. Feeling fantasy (7 questions: 1-4-6-8-21-25-31)
- C. Theoretical and aesthetic orientation (5 questions: 5-16-22-23-24)
- D. Freedom to express thoughts (4 questions: 10-12-18-19)
- E. Tendency to innovate (3 questions: 13-30-32)

Estimation of internal consistency for attitude toward creativity was calculated by using the split half reliability coefficient (by odd and even method) for two groups of fifth grade students by Spearman Brown method. The calculated coefficients for the first group (N = 31) equaled 0.81 and for the second group (N = 67) 0.75

Estimation of reliability by test-retest method was also calculated for the other group. This sample was repeated with a 5-week interval of attitude toward creativity and the result of the moment coefficient was 0.61 (Scheffer, 1998:Translated by Abolfazl Karami,1998) <sup>[17]</sup>.

Veb (2017) in his research entitled Comparing the use of modern technology and the traditional method, on the degree of academic achievement and creativity of students, the reliability of this questionnaire was 0.86.

Tavousi Roodsari (2016), in his article entitled Comparing the speed of learning and creativity of female students of ordinary schools with smart ones, the reliability of this questionnaire was 0.82.

Zamani and Azimi (2015) in his research entitled The Comparison of the effect of using new technologies in schools on the creativity and academic performance of students in Marvdasht, the reliability of this questionnaire was 88% <sup>[18]</sup>.

### Validity

In fact, if the attitude toward creativity has a good orientation towards creativity, then after reaching the educational program designed to foster creativity, the children should make meaningful progress on this scale. Two studies was executed by Fordham university creativity center for research about this question.

Both studies were conducted on 5th grade children, in each study, three groups participated: one was experimental group and two other groups were control groups. The experimental group (N = 31) received 14 hours of half-hour training by the creativity center's staff including art, writing, mind exempling and role playing. The first control group (N = 24) contacted the center's staff with the same method, but the meetings focused on rational thinking and actual activity reporting, and the second control group (N = 16) did not receive any special attention during the school year.

The utility of the school curriculum by students and the post-test were evaluated from six creativity tests including attitude towards creativity, the Smiles test and four tests from the Torrance series (1966); the experimental group had a significant difference at the level ( $P < 0.01$ ) than the control groups in three measurements, that is, attitude toward creativity and two tests of Torrance.

In another study, simultaneous validity and criterion-dependent validity for creativity attitudes between the two groups were calculated. Both were acceptable. Comparing the scores of attitude toward creativity in the two groups showed that the scores of the creative group were significantly higher than the control group ( $0 / 05 = < P 2/66 = t$ ) in attitudes toward creativity<sup>[19]</sup>

Tavousi Roodsari (2016) and Zamani and Azimi (2015) described the validity of this questionnaire suitable and acceptable in their research.

In the present study, the reliability of the instruments was obtained by calculating the Cronbach's Alpha coefficient of 82%.

## 2nd instruments, learning speed

### a. Introducing the tool

In this study, 10 questions scale of Savadi's learning speed (2014) were used to measure learning speed. Savadi has been used this questionnaire to examine the learning speed of students, and believes that this scale is sensitive to changes in learning. Savadi, using a random sampling method on 5000 male and female students in Ahwaz, showed that using this questionnaire, 95% of students' learning speed can be measured.

Savadi's questionnaire was conducted in 2014 on 5000 male and female students in Ahwaz city. Given that the purpose of the present study was to determine the learning speed of students, the questionnaire framework was set up and then the questionnaire was given to 20 students by the researchers after the literary reforms so that questions could be corrected in case of vagueness. After making necessary reforms on the questionnaire questions which containing 10 questions, the sample was selected from the students. Cronbach's alpha method was used to determine the reliability of this questionnaire. The reliability coefficient of the questionnaire was 0.96 and the test retest reliability of the questionnaire was 0.95. The validity of the questions was verified through confirmatory factor analysis, and was satisfactory. The alpha coefficient of the questionnaire in Mohammad Khani's research (2015) was 0.93 and the content validity of the questionnaire was reported as desirable<sup>[20]</sup>. The alpha coefficient of the

questionnaire in Barati's research (2016) was 0.95 and the content validity of the questionnaire was reported as desirable. In the research of Seifi et al. (2010), the content validity of this questionnaire was used to determine the reliability of the Cronbach's alpha calculation method, which was 0.86 and desirable<sup>[21]</sup>. Also, in the research of Karami, Momeni and Abbasi (2016), the structural validity of Savadi's questionnaire was confirmed and its reliability coefficient (Cronbach's alpha) was calculated 0.83. Therefore, based on the evidence of validity and reliability, Savadi's learning speed questionnaire has the reliability and validity for the research.

In the present study, the reliability of above instruments was obtained by calculating the Cronbach's alpha coefficient of 94%.

### 3. Third instruments of academic performance

In the present study, students' academic achievement is the average of the second semester of the academic year 2016-1017 which is studying in high schools in Borujerd.

Academic performance is to do a job in order to obtain the desired result and excellence in a skill or group of information. Academic performance, knowledge or acquired public or private skills in the subjects of the course is usually measured by tests and indications, or both, which teachers impose on students<sup>[22]</sup>.

The term "academic performance" refers to the extent to which learners achieve predetermined learning goals; and learners are expected to achieve it through effort and learning<sup>[23]</sup>.

In the current conditions of our society, progress and academic success are important both for the family and for learners as well as for the society. Therefore, recognizing the factors affecting academic performance is necessary. Academic performance is the student's success in one or more lessons (such as understanding, reading comprehension, or numerical computing), such improvements are measured by an academic grade test. It also implies the individual's progress in the classroom, as it is evaluated in school work<sup>[24]</sup>.

Sho'ari Nejad (1996, quoted by Khanzadeh and Aghabozorg, 2015), also writes in the definition of academic performance<sup>[25]</sup>: The general or private acquired knowledge or skills in the lesson subjects usually are measured by experiments or indications, or both, that teachers set for students.

In another definition, in academic performance, it refers to the effect of a student's or student's academic status, which may indicate the grade of a course, the average grades for a set of courses in a lesson or the average grades of different courses<sup>[26]</sup>.

Webster defines success as a student's quality and quantity. The amount of knowledge and skills of each individual in a particular subject at a given time is determined by the grades obtained in the tests according to the educational objectives of each country. Academic progress is a general concept, and refers to a process that at the beginning of its range is "learning subjects" and at the end of "evaluation" of the learned subjects. Student learning outcomes are very diverse, these outcomes have many behaviors and abilities such as: memorizing content, understanding concepts, gaining skills and abilities, applying principles and techniques, learning creator abilities, and gaining interest and attitudes from students<sup>[27]</sup>.

### The process of research implementation

This study was a causal-comparative study. The studied population included all male first-grade high school pupils studying in the 2016-2017 school year, Borujerd, with a total of 2109 students (1113 students in smart schools and 996 students in ordinary schools). Based on previous researches and authoritative research papers [16], 100 students (50 smart and 50 normal school students) were selected and studied as sample groups by using randomized sampling method. The Attitude to Creativity Questionnaire (Charles Lee Schiffer, 1989: Translated by Abolfazl Karami, 1998), Speed Learning Questionnaire (Savadi, 2014: quoted by Mohammad Khani and Mohammad Khani, 2015) [20] and the average of the last semester of the students were used to measure the variables according to the statistics provided by the experts responsible for education in Boroujerd, then questionnaires were given to students of each school during the rest of the students. Then the subjects were presented the explanations about the purpose of this research and how they answered to the questionnaires, and they were assured that the data will remained confidential by the trainee. After completing the questionnaires by subjects, questionnaires were evaluated and the ones that had been partially answered were set aside and the data of the remaining questionnaires were entered the SPSS and analyzed the input data and the hypotheses. The results of the hypotheses analysis were compared with other studies and explained.

### Results:

"There is a difference between the attitude towards the creativity of students in smart and normal schools"

Information in Table 1 and 1-1 indicate that there is a significant difference between the attitudes towards the creativity of smart and normal school students. In other words, smart school students had a significantly higher level of attitude toward creativity than ordinary students.

The results of the first hypothesis of the present study have consistency with the results of the studies, Tavousi Roodsari (2016) indicate that the creativity of the students of the smart school girls is higher than the ordinary schools; Ghane Ardakani and Nateghi (2015) indicate that the creativity and ability has been lower in the ordinary classroom students than smart classroom; Zamani and Azimi (2015), suggest that the use of new technologies in schools has a profound impact on students' education, as well as attitude, creativity and skills; Hajizadeh et al. (2014), suggest that attitudes toward creativity are more higher in students in smart schools [28]; Hakim zadeh et al. (2012), indicate that students in smart schools have more creativity than students in ordinary schools. Also, according to the results of foreign studies have consistency, Veb (2017), indicates that the new technologies increase creativity in students; Al-Zeidin et al. (2010) suggested that the level of technology use for educational purposes is low, but students' attitudes in this regard are positive and increased their creativity; Kumar et al. (2008) suggested that the use of new

technologies in schools has a profound impact on the creativity and skills of students.

But it doesn't have consistency with the obtained results from Vasefian and Naghsh's research (2014), indicated that there was no significant difference in the creativity of students in traditional and smart schools [29].

There is a difference between attitudes toward creativity, academic performance and learning speed of smart and ordinary school students.

"There is a difference between the attitude towards the creativity of students in smart and ordinary schools"

**Table 1. Descriptive statistics of variable "attitude toward creativity" in students of smart and ordinary schools**

Variable	Statistic indexes				
	School type	Mean	Standard deviation	Minimum grades	Maximum grades
attitude toward creativity	Ordinary	17/32	2/86	11	23
	Smart	20/82	2/85	15	27

According to Table 1, the mean of attitude toward creativity in the group of ordinary school students is 17.32 and the standard deviation is 2.86 and the mean for the smart school students group is 20.82 and its standard deviation is 2.85.

### Data analysis

**Table 1-1. The results of U Mann-Whitney's test comparing the attitude toward creativity of smart and ordinary school students**

Variable	Groups	Mean rank	U Mann-Whitney's value	The level of probability
attitude toward creativity	Ordinary	36	475*	0/001
	Smart	66		

\* P≤0.05

As shown in the results of the U Mann-Whitney tests in Table 1-1, the attitude toward creativity in smart students is significantly higher than that of ordinary school students (U = 475 and p = 0.001) (see Table 1).

"There is a difference between the attitude of academic performance of students in smart and ordinary schools"

Table 2 and Table 1-2 show that there is a significant difference between the academic performance of students with smart and ordinary schools. In other words, smart school students had a significantly higher level of academic performance than ordinary students.

The results of the second hypothesis of the present study have consistency with the results of studies, Mohammadzadeh (2016) [30], indicate that the performance of students in smart schools is higher than that of ordinary school students [31], indicating There is a significant difference in students' academic performance among smart schools and ordinary ones in the interest of smart schools; Dalir Naser and Hosseini Nasab (2015), indicated that students of smart schools have a higher degree of academic achievement and motivation [32]; Zamani and Azimi (2015) suggest that the use of new technologies in schools have a

profound impact on student education as well as academic performance; Momeni Mahmuei and Alizadeh (2014) indicate that academic performance in students of smart schools is significantly higher than that of ordinary school students [33]; Hakim zadeh et al. (2012), it was found that students in smart schools have academic performance better than ordinary school students; Samari and Rasoulzadeh (2009) indicated that the average variables of academic achievement and academic motivation among students learning through ICT (IT) were more than students training in the traditional way. Ebrahim Abadi (2008) suggests that education through the Web has significantly effect on the motivation and academic performance.

Also, according to the results of foreign studies have consistency, veb (2017), indicates that new technologies in students enhance their academic performance; Postholm (2016), suggests that intelligence facilitates the instructional-learning process and increases the academic performance of students; Wallace (2016), suggests that the use of new technologies has a profound effect on students' academic performance; Isava (2014), the use of the Internet in learning lessons and their academic performance is influential; Hamid (2014) indicated that students had a positive belief in the use of information technology in teaching and this made increase learning speed and academic achievement. Samak et al. (2012) Suggests that the use of computers and software and language is among middle-class students but students who were more willing to use technology had higher academic performance; Kumar et al. (2008) suggested that the use of new technologies in schools had a profound impact on creativity and skills and students academic performance; Ermerud (2007) indicated that computer-based education improves learner's academic achievement and gives them a more positive attitude toward school activities.

But with studies doesn't have consistency: Ghane Ardekani and Nateghi (2015), indicaed that there was no significant difference between the smart and ordinary classes in terms of academic achievement and motivation. Vasefian & Naghsh (2014) there was no significant difference in academic performance and creativity among students of traditional and smart schools.

"There is a difference between the academic performance of students in smart and ordinary schools"

**Table 2: Descriptive statistics of the variables of academic performance in students of smart and ordinary schools**

Variable	School type	Statistic indexes			
		Mean	Standard deviation	Minimum grades	Maximum grades
academic performance	Ordinary	14/49	2/18	10/22	19/1
	Smart	19/06	0/69	17/45	20

According to Table 2, the mean of academic performance in the group of students in ordinary schools is 14.49 and its standard deviation is 2.18 and the mean in the smart school students group is 19.06 and its standard deviation is 0.69.

**Table 1-2: Independent T-test results on academic performance variables in students of ordinary schools and smart schools**

Variable	T value	Degrees of freedom	Difference mean	The level of significance
Academic performance	14/11*	58/66	4/56	0/001

\* P≤0.05

Independent T-test results in Table 1-2 show a significant difference in educational performance variables between students of ordinary schools and smart schools ( $t = 14.11 = t$ ,  $58.66 = df$ , and  $p = 0.001$ ) and students' academic performance of smart schools have been more (see Table 2)

"There is a difference between the learning speed of students in smart and ordinary schools"

Information in Tables 3 and 1-3 shows that there is a significant difference between the learning speed of smart and normalordinary school students. In other words, smart school students had a significantly higher level of learning speed than ordinary school students.

This finding is consistent with the results of Ghasemian and Zadeh Bagheri (2016), Tavousi Roodsari (2016), Mohammad Khani and Mohammad Khani (2015), Ghane Ardakani and Nateghi (2015), Wallace (2016), Hamid (2014), Elliot (2012), and Sheri and Okaner (2007); that the learning speed of students in smart schools is higher than the speed of students learning in ordinary schools;

The results of the third hypothesis of the present study is consistent with the results of the studies, Tavousi Roodsari (2016), indicate that the speed of learning of smart girl students is higher than that of ordinary schools; Mohammad Khani and Mohammad Khani (2015) indicated that there is a significant difference between the learning speed of students in smart and ordinary schools and this difference is in the interest of the smart schools; Ghane Ardekani and Nateqi (2015) indicate that the learning speed of the ordinary classroom students is lower than the smart classroom.

Also, with the results of foreign studies has consistency, Postholm (2016), it has been suggested that intelligence facilitates the instructional-learning process, Wallace (2016), that the utilization of new technologies has a profound effect on the learning speed of students; Hamid (2014) indicated that students had a positive belief in the use of information technology in education, which also increased the speed of their learning and their academic achievement. Elliott (2012) suggested that Web- animation based plays an important role in learning science, language, and reading in third, fifth, and eighth grade students; Sheri and Akaner (2007) suggested that computer-aided learning providing immediate feedback, avoiding subjective judgment, facilitating the process of individualization of education, increasing the range of attention and motivation of learners, and diverse learning.

"There is a difference between the learning speed of students in smart and ordinary schools"

**Table 3: Descriptive statistics of variable learning speed in**

students of smart and ordinary schools					
Variable	Statistic indexes				
	School type	Mean	Standard deviation	Minimum grades	Maximum grades
Learning speed	Ordinary	31/3	4/06	22	40
	Smart	34/48	3/7	26	40

According to Table 3, the average learning speed in a group of students in ordinary schools is 31.2 and the standard deviation is 4.06 and the mean for smart school students is 34.48 and its standard deviation is 3.7.

### Data analysis

**Table 1-3. The results of the U Man-Whitney test on comparing the learning speed of students in smart and ordinary schools**

Variable	Groups	Mean rank	U Mann-Whitney's value	The level of probability
Learning speed	Ordinary	39/43	695/5*	0/001
	Smart	61/57		

\* P≤0.05

As evidenced by the results of the U Man-Whitney tests in Table 1-3, learning speed in smart school students is more meaningful than that of ordinary school students. (P = 695.5 and p = 0.001) (see Table 3).

Before performing the statistical tests, it is necessary to check the normality of the collected data. For this purpose, the Kolmogorov-Smirnov test has been used. If in this test the probability level is less than 5% significant, the distribution is not normal and otherwise the distribution will be normal. The results of this test for the variables of this research are as follows.

**Table 4: Results of Kolmogorov-Smirnov test on the normality of the data obtained from the study**

Variable	Statistical indexes			The level of significance
	School type	Statistical value	Degrees of freedom	
Attitude toward creativity	Ordinary	0/085	50	0/2
	Smart	0/105	50	
Academic performance	Ordinary	0/175*	50	0/001
	Smart	0/098	50	0/2
Learning speed	Ordinary	0/125*	50	0/048
	Smart	0/159*	50	0/003

P≤0.05\*

As can be seen from Table 4, the significance level of attitude toward creativity and learning speed in ordinary school students and learning speed variable in smart schools is less than 5%, their distribution is not normal.

**Table 1-4. The results of the Levene`s test on the homogeneity of the modified data from the study**

Levene statistic	Degrees of freedom 1	Degrees of freedom 2	The level of significance	
Academic performance	57/36	1	98	0/001
Attitude toward creativity	0/278	1	98	0/6
Learning speed	0/641	1	98	0/425

Academic performance	57/36	1	98	0/001
Attitude toward creativity	0/278	1	98	0/6
Learning speed	0/641	1	98	0/425

P≤0/05

As shown in Table 1-4, the level of significance in the academic performance variable is less than 5% and homogeneity of variance is not observed.

Since, in some variables, the assumption of normal and homogeneity of variances is not observed. Therefore, the use of multiple variance analysis tests and statistical analysis of the general hypothesis is not possible.

### Discussion

In explaining the first hypothesis, according to the results obtained in this study, students of smart schools had significantly higher levels of attitude toward creativity than ordinary school students, it can be said:

According to Perkins (1995; quoted from Taleb and Hassanzadeh, 2015) [3], seven key principles in smart schools are creative knowledge, in which smart schools provide the most impact on students' intellectual and practical growth by providing appropriate content and, instead of consuming them information and knowledge are also provided by students with the ability to produce knowledge; learning talent, which prepares students for thinking, provides them with a rational basis for matters; attention to the comprehension of the lessons, which means that the goals of the programs and activities of smart schools are understandable to students so that school outputs are based on predetermined goals and for this purpose, students have more appropriate participation in learning; learning with the aim of mastering and transferring it, is another principle of learning in smart schools, which is in fact the use of teaching techniques and methods that except enhancing motivation providing simulation and modeling instruction commands for them, which will allow students to automatically transfer this skill to others. This point plays a very useful and effective role in the learning process. The next principle is the assessment of learning in a centralized manner, so that evaluation is based on learning not the product and the result of the work that engages students and teachers in a process, and the result of the evaluation is based on the quality and application of it on the students, and the tests are used in the best condition as an evaluation instruments. They also overcome issues of creative thinking achievements and a deep understanding of issues, preparing students and even teachers for solving complex educational problems.

In the smart schools, students and teachers easily show this interest and rely on creativity and innovation, and present new ways of solving issues. Ultimately, school as an educational organization, school not only for students but also for teachers, managers and even students' parents is learning environment

and the smart school learning organization is in a way that participates in a natural process of setting goals, content, evaluation, and monitoring, and the creation of a dynamic system for all members<sup>[34]</sup>.

Also, the approach of smart schools is a comprehensive and integrated approach. It is for "comprehensive" to meet the needs of students with different learning methods and use multimedia instruments (visual, verbal, audio and scientific) to provide grow broad growth field of student talents and so it is a "compilation" that, instead of instrumental look on information technology, combines curriculum and learning methods and practices into an efficient and effective educational system. In addition, training models and exercises have been designed to develop these skills for students. In other words, smart schools are composed of interconnected components designed to motivate students' curiosity and active participation<sup>[13]</sup>.

On the other hand, by examining the theoretical literature of traditional and smart schools, it is understood that the extreme use of traditional methods in which teachers often play a basic role in class, and more on the basis of lectures and verbal skills, makes the student less likely to participate in the teaching and learning process and play an active role. Students studying in this type of system do not find the opportunity to show creative talents and gradually lose their mobility and dynamism<sup>[3]</sup>.

In this regard, it should also be noted that, in many cases, the instructor's or teacher's lack of familiarity with the methods of developing creativity of students alone is a major obstacle in this regard. A teacher who does not have the correct knowledge of the nature of creativity, barriers, and methods of education, obviously, not only can not take action to develop the creative talents of their students in the classroom, but may also become unconscious and gradually transform classroom into an environment in which student creativity is suppressed<sup>[6]</sup>.

Given that the role of teacher has changed in the smart schools, it has become "facilitator" from "teacher" in learning. In other words, the role of the teacher has changed from "master on the stage" to "succor in sidelines"<sup>[35]</sup>. In these schools, the teacher should know well where references exist when students raise a question they can guide them to the resources, so the role of the teacher in smart schools is considered to be a necessity as this change of role in students can lead to creativity. As the student studies the subject himself, he is confronted with new issues through his research and the use of technology, and for guidance they are directed by the teacher and referred to the new sources. This can be effective on student's attitude toward creativity. Therefore, it can be argued that the attitude of smart school students is higher than the proportion of creativity among ordinary school students due to the facilities of smart schools and student-centered teaching methods rather than teacher-centered.

In explaining the second hypothesis, according to the results obtained in this study, the students of smart schools had a significantly higher level of academic performance than ordinary students, it can be said:

The use of information and communication technology leads to increased academic achievement and learning outcomes (academic performance)

Scheurman & Pedro (2001; Leon and Valdivia, 2015)<sup>[36]</sup> identified three major factors: macro (family and student characteristics), middle level (school) and micro level (organizational characteristics), each interacting with each other and influencing student learning. In smart schools, online environments expose partnerships not only to students, but also to parents and administrators. Now the online environment is a learning community with personal learning experiences that allows students to create creativity and self-esteem. This community prepares students for learning with emotional-social connections, and places them at the hands of teachers and friends and into the larger world<sup>[3]</sup>.

For more than a decade, information and communication technology has put in place all social activities, in particular education, and has affected educational systems and educational environments<sup>[7]</sup>. Education is the most important role and task in this direction; that is, if it is appropriate in schools and educational environments to foster a researcher's spirit and provide a forum for the exchange of ideas, opinions and thoughts, the educational environment rather than the one-way transfer of information is guided in two-way information acquisition and the knowledge and the role of teachers was centralized in facilitating the instructional-learning process, the favorable field will be provided for the growth, development and excellence of the individual and the community<sup>[34]</sup>.

Smart schools are exactly appropriate to the scientific and technological developments of the day. Preparing children and adolescents to face acute and future issues and respond to the future needs of the community involves the creation, development and equipping of smart schools. In fact, the academic achievement of learners is one of the most important criteria for assessing the performance of teachers.

Students also have an academic grade showing their scientific ability to enter the world of work, employment, and educational levels; education with the help of new technologies in smart schools causes learners to have high self-regulation learning, because learners do most of the work actively and are actively seeking new information and resources. Student's activity and engagement with the problem are considered as one of the important approaches in stable and desirable learning that is considered in technological education. Students in this method of teaching receive appropriate feedback, using the appropriate time period to learn the lesson. On the other hand, due to the use of various audio, video, graphic and animation capabilities, multimedia software receive multi-touch simultaneously, make it possible for students to get the content more attractive, more diverse and more complete and increases the motivation of the learner to learn more<sup>[6]</sup>.

In fact, the use of information and communication technology has a positive effect on academic and result achievement of students. Information and communication technology in smart schools by enabling students in the learning process will increase student learning and reduce students' unwillingness and

lack of concentration on their assignments. On the other hand, these tools, in addition to using the students' hearing sensation, stimulate other senses, such as visual and, most importantly, cognitive activity in students. Using group learning and the democratic environment is another factor that affects academic performance and academic achievement in smart schools [37].

On the other hand, in traditional schools, students have lower levels of education and have less participation in the classroom and are not encouraged to learn and understand deeply; therefore, they do not enjoy learning and do not have the incentive to learn more and progress. But in smart schools providing feedback in the learning process, the need for more learner participation in the learning process, the promotion of positive learning of the learner, as well as the presentation of original and real tasks, make students learn deeply rather than memorizing the content and thus they find motivation to learn and progress more [10].

In explaining the third hypothesis, according to the results obtained in this study, students of smart schools had significantly higher levels of learning speed than ordinary students, it can be said:

In the smart school, hardware, software, communications, and educational equipment are among the main requirements, and the development of a smart school should be developed based on the needs and requirements of the instructional-learning process. In schools, the maximum use of existing infrastructure and equipment must be done and the availability of hardware and software on its own does not mean school intelligence. In smart schools, infrastructure is important in enhancing the instructional-learning process [13].

In smart schools, computer affects on teaching method and assessment and modifies curriculum. Alternatively, the computer replaces the blackboard and the CD instead of the notebook. Students can get information on the Internet. In this system, the teacher and the student both produce electronic content and lessons in CD format. In these schools, education is not exclusive to the teacher and the student plays a major role in learning the scientific topics. Teachers use the content of electronic curriculum to better understand the lessons and save time, and students also have the opportunity to reveal their abilities and capabilities to produce content. Achieving success is achievable and its extent depends on student endeavor and pursuit and correct direction and guidance. In this way, the spirit of research and searching will replace the student's intuitive spirit and will the main pillar for any change is a change in thought, and tools and facilities are the only means to deal with the thoughts. Students learn to process a large amount of information and use this information to learn more. Students can even communicate with the world's scholarly resources and teachers and other school students [7].

- Considering that the goal (learning to be) is the development of a personality and the ability to act with greater independence, critique and scrutiny, a power to take on individual responsibilities. In this regard, education should not ignore any individual dimensions and capacities, including memory, reasoning, aesthetics,

emotions, physical ability, and communication skills. Therefore, the importance of education according to the needs of the individual and society is felt most of all because the world connected to the information networks is a labor force applicant who understands how to use technology as a tool to increase productivity and creativity. such skills, are the ability to argue on the basis of information, a process in which valid sources are identified and transferred to others, in addition, employers expect workers to have the skills of working together in the group and sharing information in the global network and problem analysis from the multidisciplinary view. Because these networks are international, employers are looking for people who have the capacity to interact effectively with those who have different cultures and languages, and finally, the workers of knowledge age must be flexible and able to learn in the most effective way as fast as the dynamic working environments change. Based on what was stated in this research, it can be said that the intelligence of classrooms needs to change the education system of the country. In other words, the establishment of smart schools will not be possible unless there is a change in the structure of the education system, which requires long-term planning, in order to develop the necessary sub-bases including communication infrastructure, appropriate content, teacher training, changing educational methods and parenting culture, creating and this should be done step-by-step and with thought. The new e-learning system brings unique benefits to individuals, organizations and training centers. In the past, all of the training was conducted in the form of face-to-face classes, in which the classroom was centered around instructor training. With the advent of the Internet, e-learning has expanded the scope of education and brought about the sharing of knowledge and information. By smarting computer classrooms, it can greatly influence the teaching and evaluation process and modifies the curriculum somewhat. With the diversity of educational media and the diversification of the space and instructional and learning environments in the curriculum, students and teachers will be able to acquire new experiences in the field of science and research and it can be said that smart school has a positive impact on students' learning speed, so that the learning speed of these students is higher than that of ordinary students [3].

### Research constraints:

- Given the fact that the students completed the questionnaire in the presence of each other, they were able to influence each other's responses.
- The process of research and completion of the questionnaire interfered with the students' curriculum and greatly complicated the implementation of the questionnaires.

- Due to the closure of schools in the middle of the work, filling a number of questionnaires was difficult.
- Considering that the research in the first year of high school and in the smart schools and the ordinary schools, so it has not taken into account other grades, it has created limitations for generalizability to other grades and schools.

### Research suggestions:

- For future researchers, it is suggested that the subject of this study be comprehensively implemented in all grades and in all cities of the country.
- For future researchers, it is suggested that the subject of this study be implemented by considering gender variables.
- Future researchers should be encouraged to conduct studies on the comparison of psychological, cultural and socio-economic components in ordinary and smart school students.
- Future researchers are recommended to conduct studies on the impact of web-based educations, animation and ... on creativity, academic performance and student learning speed.
- According to the findings of this research, conducting studies in a non-questionnaire, for example, interviewing students, can provide more accurate and valuable results.

### Executive suggestions:

- Considering the importance of educational technology in increasing the quality of education in schools, it is suggested that financial resources and appropriate equipment be provided for the establishment of smart schools.
- According to the confirmation of the research hypotheses, it is suggested that politicians and planners promote school intelligence based on existing tools and facilities.
- It is suggested that school principals, by organizing classes and workshops, focus on the school intelligence and factors affecting creativity, academic performance and student learning speed, which play an important role in the growth and dynamism of the community, increase and upgrade these components in students.
- Due to the lack of information on teachers and administrators in the field of smart schools, it is suggested that through training courses and workshops, teachers and managers become more aware of this issue.
- Due to the low level of computer literacy of teachers, it is suggested that in-service training courses in the field of information technology should be organized in accordance with the duties and performance of teachers.
- It is recommended that a law be passed to oblige students, teachers and administrators to carry out daily tasks and

tasks related to their duties and the use of technology in education.

- It is recommended that students of smart schools with high performance, creativity and learning speed be encouraged and modeled for other students.
- Out-of-class classes, such as robotics training, are recommended for students interested in raising creativity.
- It is suggested that educational books such as work and technology be included in the curriculum or student's super-Program in the field of Information and Communication Technology in all academic levels.
- It is recommended that directors and teachers active in smart schools be encouraged.

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