Research Article

The Correlation between Personality and Creativity: A Study of Contestants at the National Industry-Related Skills in Taiwan

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Abstract

Creativity has become an essential indicator of the competitiveness of nations, but there is still a lot of space left for discussion when it comes to the definition of creativity. Through reviewing the relevant literature to the definitions offered by different scholars, this paper uses Mel Rhodes' "4Ps Model," which takes the four influential factors (Process, Personality, Product and Press/Place) in displaying creativity into consideration to define "creativity". Studying and categorizing the contestants in the National Industry-Related Skills Competition in Taiwan with John Holland's Types of Personality, this paper tries to understand the connection between creativity in participants' products and their personalities with their various reflections and reactions on the designed examination questions. The result concludes that the directions given by the examinations will be read differently when they meet the people with different personalities, which further influences the performance of creativity. After comparing and contrasting the outcome for the competition and the personality inventory test, the direct relation between personality and creativity is demonstrated.

Keywords: Skills Competition, Personality, Design education, Creative

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Introduction

After reviewing the literature on creativity generally, the difficulty of formulating a concrete definition for creativity is found, for the scholars belonging to various schools point out the value and essence of this term in different ways. Haw-jeng Chiou (1990) suggests the possible reasons why the concept of creativity gets confusing: First, the dimensions related to creativity are too wide to be limited on a common ground. Second, the evaluation on creativity, as the difficulty the intelligence tests may share, involves some indirect observations and bewildering constructs such as human intellectual process, characteristics, and motivation state. Third, the trade-off between different standards and evaluation-related problems will also cause confusion. Fourth, how to meet the need of social issues leads the perplexity as well. After some twenty years, though the definition still cannot be settled, the weight of creativity can be generally concentrated on "thinking." The emphasis on the ability to think both extensively and integrally points out that creativity is the brainchild of thinking, you can upgrade thinking to imagination become a creation. "Imagination is your superpower," a line from a commercial advertisement, proves the charm of creativity.

Whether the definition of creativity is unified will not influence the demand of the Taiwanese industry, government and academia for creativity. Believing that creativity is the indicator of the competitiveness of a nation, Taiwanese government actively cultivates personnel with creativity. Government's advocacy of the cultural and creative industries as well as subsidy for correlated projects speaks for the fact that cultural and creative industry is equivalent to the future of the nation. Besides, the collaboration between the industry and the school as well as the internship institutions outside school in vocational education system is the helper for students to start their careers. All the above mentioned show the importance of creativity and power to design. However, there is no related information that can demonstrate the connection between the empowerment on campus and creativity. Sternberg and Zhang (2005) think whether students can show their strength; teaching and evaluating are the crucial factors. Sternberg and Lubart (1999) propose that the performance of creativity should be considered in multiple dimensions for the performance of creativity is constructed by several factors. How to cultivate the personnel fitting the requirement of the job market has become the prior aim of vocational education in Taiwan. Thus, this paper will seek to understand the evaluation of Applied Design with the revisit of related literature, proposing the possible way to design the competition and the role of the gatekeepers in order to discuss the connection between the personalities and creativity of participants of the National Industry-Related Skills Competition.

Literature Review

National Industry-Related Skills Competition

Originally named Vocational Skills Competition for Mechanical Engineering Students, National Industry-Related Skills Competition started from 1957 when the Department of Mechanical Engineering was the only vocation category available and the model schools with this category should present three to eight students to take apart in this competition. Because the Ministry of Education paid special attention to this competition at that time, "Bylaw of Technological Competition" was then carried out. The Ministry of Education planned to hold an annual competition so as to enhance the public understanding for vocational education (Wen-Tsung Chen, 2005). With the advanced technology and the influence of changing time, the vocation categories

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included in the competition are increasing year by year. Cultivation of participants also becomes a significant task for vocational high schools. Among those categories, Applied Design is a branch from the Department of Arts and Craft, which belongs to the design cluster. The reason for Prof. Chian-Hwa Wu to establish this vocation category in the competition is that he hopes students can harbor the knowledge of design, creativity and implement ability for design. The fact that Applied Design is actually the application of design reminds people that the nature of design is grounded in the basis of everyday life. Thus, Tien-Li Chen, the coordinator of the competition in 2014, indicates that Applied Design is a vocation category in which the students should possess the ability of "thinking" and "making" simultaneously. In other words, this category cultivates and examines students' creativity and execution. The participants of the competition are the top students from the design cluster in vocational schools, passing the first-stage selection held in their own schools. Assisting the coordinator in dealing with details of the competition, I have the opportunity to touch the centre of the competition, getting to know the participants who are the elites of Applied Design and further studying on the connection of their personalities and creativity via their reaction to the direction of exam questions and creativity evaluation. In view of the fact that the competition has its historical importance and causes great impact on the cultivation of talents in the field of Design Education, this research chooses to study the participants in this competition.

The Definition of Creativity

From a sociology standpoint, T. Amabile (1983) puts forward a proposal of the component theory of creativity, regarding individual creativity as the synthesis of expertise, creative thinking and intrinsic task motivation. In his study, Necka (1986) finds there are five indispensable conditions concerning creativity: environment, motivation, personality, creativity and thinking ability. Among these five conditions, he lays an emphasis on the influence of environment which is the most critical part to nurse creativity because proper environment is the propulsion to motivate designers and to inspire them in terms of creativity and thinking. Simon (1988) defines creativity as a special action to solve problems, considering creativity the solution to blurred questions, which helps people to get the acceptance of the society. Csikszentmihalyi M. (1988), (1997), (1999) examines creativity in a systematic or evolutional way. His theory contains three subsystems: domain, field, as well as individual, and suggests that the discussion of creativity should include the interaction of the three. Croply (2001) pinpoints that the factors of creativity contain at least four facets: first, (common and professional) knowledge; second, thinking ability; third, motivation (question consciousness); fourth, personality. Based on some different viewpoints, His-pi Lin defines creativity as the innovation for the existed fields or the transformation of the action, ideal and production in the transition from the existed fields to the new ones. Other research (HMI, 2006) has shown that teachers' understanding of the term "creativity" varies enormously. How creativity should be embedded within the school curriculum is also open to diverse interpretations: some teachers identify creativity with particular areas in the curriculum; others argue that creativity is synonymous with "problem-solving," "imagination" and "lateral thinking skills." From Dewey, who defines creativity as the process using creative thinking to solve problems to HMI, whose definition of creativity is the pronoun of lateral thinking ability, though the details of the definitions given by different scholars are not that close to one another, what we can

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find is that most of the scholars identify creativity with the ability to think extensively and the capability of integrating one's thoughts. From personal growing background and personalities to the ability to solve as well as to integrate problems in one's professional fields, they all approve the imaginable influence creativity works on a person's thinking ability.

Evaluation of Creativity

Jing-Jyi Wu (1998) also mentions that Houtz and Kurg (1995) think the evaluation of creativity in the future will be more experience-orientated, focusing on the capability and cognitive skills. Amabile (1983) thinks that once valued by experts, a reaction and production of work can be referred to as a sort of creative performance. There are three basic elements suggested by Amabile to discuss the birth of a creative product: domain-relevant skills, creativity-relevant skills and task motivation. (1) Domain-relevant skills are the basic level and can interact with materials in every domain. (2) Creativity-relevant skills belong to certain accommodating level. When mentioned, the term refers to the common basic skills in certain fields, not certain operation. (3) Task motivation located in the most special level will change along with the fields and the nature of operations. Sometimes, even in the same operation, this motivation changes with time flow.

Csikszentmihalyi (1996) claims that creativity does not happen in the human brain but it is an interactive result produced by the interaction between individual thoughts and the society. He emphasizes that it is necessary to put a value on creativity with the process of undergoing the social judgment. Csikszentmihalyi's concept is good for examining the professionalism of industrial design, which emphasizes creativity (Woei-yun Ho& Yen Chin-Den, 2003). Csikszentmihalyi's study (1988) on

the mechanism under which professional researchers will be deemed creative points out three necessary circumstances: Fields (the symbolic system for certain professional knowledge, such as physics or musicology), academic disciplines (those who can recognize people with creativity, such as professors or critics), entities (individuals or members of certain groups).

Rhodes (1961) analyzes some forty definitions of creativity, inducing them into four groups: Process, Personality, Product and Press/Place. Jean Carabine (2013) envisages that as she gains more experience as an artist and develops greater familiarity with materials and knowledge through 'learning from experience', her capacity for negative capability will grow. Referring to the study made by Shyh-Nan Liou and Kuang-chih Kuo in 2001, this paper also adds "persuasion" suggested by Simonton (1988) on Rhode's "4Ps Model." The following part will give the more implicit definition of Rhodes' concept: (1) Personality refers to what kinds of person own creative qualities; the evaluation is inclusive of personality, motivation, attitude and so on. (2) Meaning of Process indicates that from the angle of education, what has happened in the process is more important than the produced product. The training of creativity begins from this basis; for laying emphasis on process can satisfy the inner motivation and the learning-oriented achievement. (3) Definition for Product: All creative products should have two qualities— novelty and appropriation. The former asks for originality and the latter should take the need of tasks, including usefulness, meaningfulness and value (the validity of commodification) into consideration. (4) Press/Place has the intimate relationship with creation because creation is the product of pressure and environment. Tardif and Sternberg (1988) defining creation from this aspect think the environment of

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creation should count the relationship between (academic and cultural) fields, (social-environmental) location and (social and historical) context.

Although thinking ability becomes the main indicator of creativity, while evaluating creativity, most scholars still deem the creation to be one of the pointers of one's creativity. Guilford (1956), the first one that considers creativity has something to do with the ability of divergent thinking in one's intelligence structure, regards creators with creativity as the ones with cognitive characteristics such as fluentness, flexibility, quickness, originality (quoted from Mei-hui Wu, 2001). Later, Torrance (1975) develops Torrance Test of Creating Thinking, which is based on Guilford's idea of divergent thinking. Torrance believes that the decisive factor to affirm a creative product lays in newness and usefulness; he inducts the process of the formation and the acknowledgement of creativity as "an individual with creativity potential showing his/her creative performance or achievement in certain professional field and further getting the recognition of the gatekeeper in the process of learning, understanding and problem-solving." All the literature reviewed demonstrates that there is no fixed way to evaluate creativity. Sterberg (1993) points that if objective and subjective methods for evaluation can be the reference to one another and a variety of elements creating interaction can be studied as an integration in a broad sense, creativity can appear as an entity (Lian-wen Mao, Yu-Yü Kuo, Lung An Chen& Hsin-Tai Lin, 2000).

John Holland's Types of Personality

John Holland (1959) developed a typology theory (Fig.1), according to which, most people can be categorized as six types in our culture: realistic type, investigative type, artistic type, social type, enterprising type, and conventional type. The determination of personality types can be examined through psychological test. The first alphabet of each type is arranged to form a hexagon with the order of RIASEC. After filling the test score in the hexagon, one's consistency, differentiation, and congruency between personality and career interest can be studied. Consistency is a result coming from the similar scoring of neighbouring areas in this hexagon picture. The more common characteristics these areas share, the higher the consistency would be; for example, I-A, A-S, S-E, and E-C are the separate result of high consistency. Differentiation is the scale between the highest score and the lowest score in the test. The bigger the scale is, the higher the differentiation is. High differentiation represents that the personality and career development are more definite and stable. Likewise, the smaller the scale is, the lower the differentiation is. Low differentiation represents that the personality and the career development of the person are neither definite nor stable. It may be more variations taking place in the career of the person with low differentiation. Relationship between Rhode's "4Ps Model" and John Holland's Types of Personality (Fig.2).

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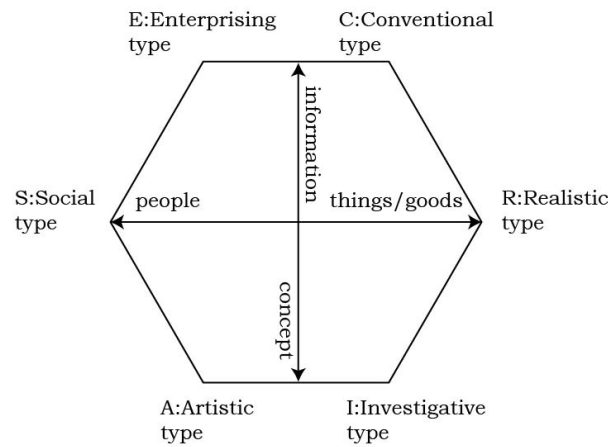
Fig 1: John Holland's Types of Personality
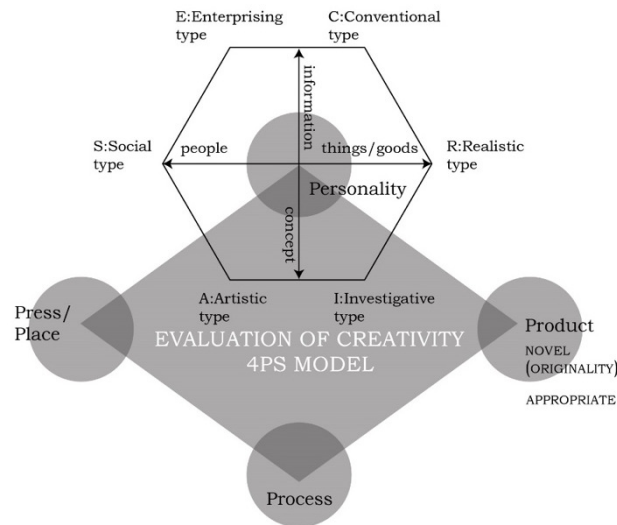
Fig 2: Relationship between Rhode's "4Ps Model" and John Holland's Types of Personality

Methodology

The participants of this study are totally 38 contestants in Applied Design of National Industry-Related Skills Competition. The contestants are vocational school students in departments related to the design cluster, selected as the representatives of each school by

regulations. Holland's Personality Characteristics Inventory is employed before the competition takes place so as to study the evaluation criteria of creativity through knowing the creators' personalities. The quality and quantity of every contestant's competition result is the reference to the evaluation. Judges for the creative quality part are professors

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from departments related to the design cluster, evaluating a work via the content it presents. Because the result of competition will influence the contestants' college application, the competition is divided into scholastic ability test and skills test. In the evaluation of creativity, the format of students' creation is not limited. The exam questions will be designed by professional gatekeepers of their departments accordingly. The chance of being a part to design examination questions helps this paper to analyze the related impacts which the content of the examination may have on the contestants. The theme of both scholastic ability test and skills test is consistent but the way to display it is different. The theme of skills test is to develop electronic devices. Compared to those of the scholastic ability test, the questions in this part are more abstract. The questions in scholastic ability test guide contestants with figures and words to enable them to focus better. Both scholastic ability test and skills test are evaluated with the quality and quantity of each contestant's competition result (Fig.3). Gatekeepers are six professors from departments of design cluster in colleges/universities of Taiwan. They evaluate works of creators mainly on the quality of works. The process of evaluation is in coordination with "4Ps Model" developed by M. Rhodes, including (1) the personality of creators which will be analyzed, (2) the twelve-hour creating process, (3) the product as the result of creation which will be evaluated by its innovativeness and applicableness, (4) pressure which is built up for the result of the competition will impact contestants' college admittance. This study attempts to examine personalities and creations of contestants by paying special attention to the creating process and pressure the student's shoulder.
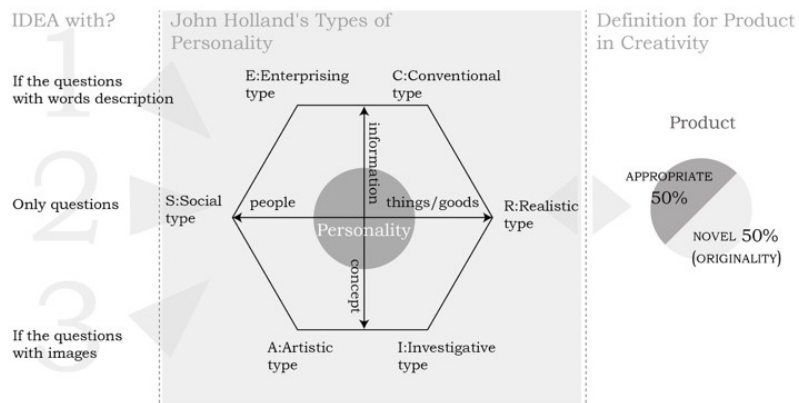
Fig. 3: Experimental Design about John Holland's Types of Personality and Evaluation of Creativity
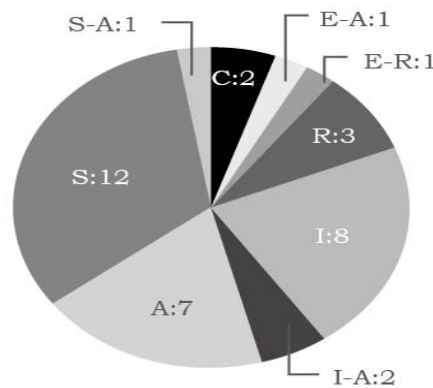
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Results

The Connection between the participants and their personalities

This paper makes use of the Holland Occupational Codes to analyze the

personalities of the thirty-eight participants (fig.4), getting the following results: one for enterprising-artistic type, enterprising-realistic type, enterprising-artistic-investigative type, and social-artistic type; two for conventional type and investigative-artistic type; three for

realistic type, seven for artistic type, eight for investigative type and twelve for social type. From the result we can see that the major personality of the participants is not the artistic type that we may expect to see but the social type whose social sensitivity and communication are higher. People belonging to this type mainly use sense and instinct to help others to solve problems. The second highest number goes to the investigative type; people of this type are used to solving knowledge problems with abstract concepts. The artistic type is the third in the rank; people of this type are highly instinctive and sensitive to affection and feelings.

Fig.4 The Holland Occupational Codes to analyze the personalities of the thirty-eight participants

The attribution for leading participants to have the above-mentioned tendencies can be traced back to the training purpose of schools. For they are chosen to be the representatives of each school, besides professional skills, the participants should possess the possibility for cultivation. The participants belonging to the social type express themselves better when it comes to interpersonal relationship; besides high degree of adaptability and sensitivity,

participants of this type will also have the qualities of the investigative and the artistic type. This also indicates that students with qualities of these three types fit the cultivation from schools which require them to have the ability to resist pressure, communicate, think abstractly and solve problems in creative ways.

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The Connection between the participants' personalities and Creativity

Through the criteria of novelty and appropriation Torrance (1975) suggests, this paper explains the way to evaluate contestants' works. Facing the exam questions without the help of words or images, the participants of investigative and artistic types have better performance, far in advance of the participants of other types. Participants of the investigative type are used to making use of abstract concept to sort things out. Owing to the absence of words or images, they can use abstract theme to duplicate the practice and further make their own judgment; curiosity is also an element for people of this kind to analyze the situation and to aim at the targets in order to find the reason or the basis which helps to solve problems and to sketch to express their ideas. Participants of the artistic type have sharp sense, unerring instinct and rich imagination so they can answer the abstract themes with their own personal experience. These two types share the characteristic of "curiosity," which tells the fact that curiosity can stimulate participants' ability to solve problems when they meet abstract questions. Though one belongs to the category of rationality and the other is more inclined to that of sensibility, both of them can produce decent thoughts and performance

while facing the challenge of the same issue (Fig.5).

When it comes to the questions with images, participants of the social type show higher creativity, for people of this type care about interpersonal relationship and are more concerned about the human need. Among the questions with images, there is a total of fifteen images to help the participants to compose and add their own thoughts to produce or compose new creations. Contestants of the social type can master the information with the help of images and thus get better grades.

As for the exam questions with words description, participants of artistic, social and investigative types perform evenly. This part of exercise offers the viewpoint of how Steve Jobs changes the world to provide the participants ideas for inventing electronic devices. These three types of participants do not show as much newness and appropriation as they do in answering the questions with images. One of the possible causes may be that the participants do not understand Jobs' idea of design. Another possible reason may be poor understanding to words and the percentage of scholastic ability test, which only occupies 10 percent in this competition. The low percentage will influence the strategy adopted by the advisors to train their students so the percentage of the future competition will be adjusted to achieve the aim of cultivating the participants with balanced abilities in Apply Design category.

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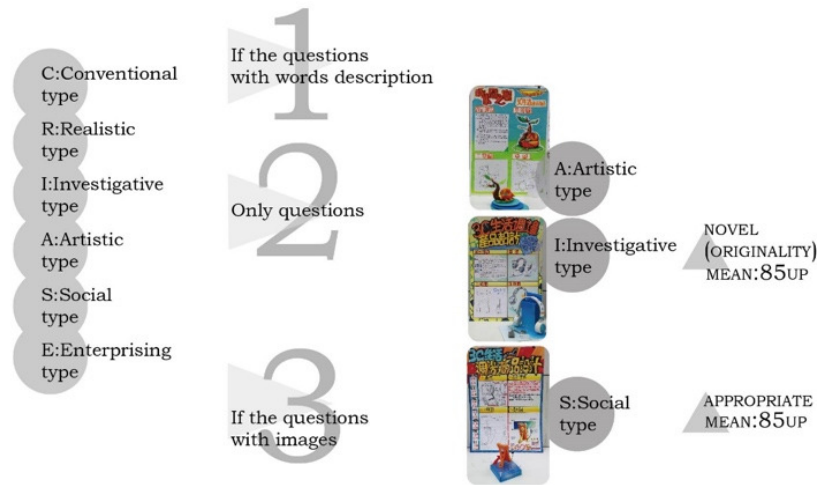
Fig 5: The Connection between the participants' personalities and Creativity

Discussion

Exams are the most common criteria of evaluation in Taiwan education system. In the past, Joint College Entrance Exam was the only indicator for students to choose their future majors and professions. However, in the recent years, the standard of getting admitted is changing. For most students of vocational schools, they have various ways to get admitted and National Industry-Related Skills Competition is one of the stepping-stones. The teachers of these schools spend a year selecting, cultivating and training students in order to help students who are under the stressed environment to get the best result in the shortest time.

The design of this competition mainly intends to select outstanding students for departments related to design cluster in Taiwanese colleges and universities. A large amount of literature on creativity is gathered and organized before the competition, and such literature is collected during the process for formulating examination questions as well. Various challenges are inserted into questions of test to conform the requirement of Applied Design. To maintain the fairness and purposiveness of the competition, theories of Csikszentmihalyi (1996), Rhodes (1961), and Torrance (1975), are selected to be the basis of questions and evaluation criteria formulated under Professor Tien-Li Chen's direction and the repetitive confirmation of the applicableness with him. Besides, Rhodes' evaluation of a creator (1961) and the test of Holland's personality inventory are also a part of the design of the exam questions. After comparing and contrasting the outcome for the competition and the personality inventory test, the direct relation between personality and creativity is demonstrated. The presupposition in this study is that the professional competence of contestants is consistent. The contestants with the personality of the artistic type and the investigative type are able to catch a direction in abstract questions rapidly and accurately to find

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out the potential solution. Social type contestants are able to develop unique and applicable products correctly by the assistance of images. The contestants of these three personality types are with more curiosity and sensibility than the contestants of other types. The social type contestants conform to the qualification of contestants training better. Then the task for teachers in vocational schools is how to assist social type contestants presenting their creativity in abstract thinking.

There are four stages this study involved in this competition after recognizing the components of creativity from gathered literature: questions designing, questions solving, formulating the criteria to evaluate gatekeepers and analysis of the competition result. The idea that "Imagination" is the starting point of creativity is recognized in the competition. Students belonging to enterprising, conventional, and realistic types have better competence of organizing and of material processing; however, they are less able to master abstract thinking. In other words, the competence of presenting things as a whole is advantageous to such types of contestants. Through the arrangement of the competition and analysis of the competition result, the recognition of the relation between creators and creation can be the guidance for teachers to cultivate contestants, for such recognition suggests that creators with different personalities can be trained with different methods. This recognition also provides participants of the competition with a way to understand themselves and offers teachers directions to train students.

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