

A Study on Learning Motivation in Woodwork Heritage

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ABSTRACT

Taiwan's society has transitioned from manufacturing-oriented to design-oriented in recent years, and the number of workers in the traditional woodworking industry has continuously decreased. To maintain talent and technology in Taiwan's traditional manufacturing industry, this study explores the learning motivation for learning of woodwork heritage to build a foundation for traditional woodwork talent development. We first conduct a literature review to understand woodwork heritage and learning motivation in Taiwan. Next, we formulate an open-ended questionnaire on learning motivation, and administer the questionnaire to 50 students of a university's woodwork center. This study then uses card sorting on the questionnaires to understand the learning motivation of current woodworking learners. Results show that the main reason students learn woodwork is because: (1) they are interested in it; (2) they want to gain a sense of achievement; and (3) they aim to strengthen their competitiveness. The professional skills students hope to learn from courses include furniture design, traditional techniques, machinery manufacturing, and woodwork related knowledge. Furthermore, students believed that learning woodwork can change their behavior (including work, life, and creation) and attitudes (including way of thinking, aesthetics, knowledge, and characteristics).

Keywords: Woodwork Heritage, Woodwork Design Education, Learning Motivation

1. INTRODUCTION

Taiwan was known as the kingdom of furniture (1966-1980), once exporting furniture on a global scale (Hsu, 2013). However, with market changes and the growing labor cost in Taiwan, furniture factories gradually relocated to China and Southeast Asia after 1990. The furniture industry in Taiwan transitioned from OEM to ODM¹, affecting the ecosystem of Taiwan's furniture industry. Furniture related work opportunities significantly decreased in Taiwan, and furniture manufacturing talent disappeared. This created a severe gap in furniture manufacturing technology and talent. Hence, the furniture industry urgently needs to cultivate talent and pass down the craft of woodworking, to assure a supply of future talent.

Masters and apprentices often engage in one-on-one interactions in the process of woodworking education. This apprenticeship allows woodworking techniques to be preserved and passed on, but furniture manufacturing is a laborious task that involves the use of mechanical equipment, and learners are easily exposed to danger without a skilled teacher to supervise them. In the past, woodworking learners aimed to gain a skill for them to take a place in society, but learners today are significantly different. Lin (2015) observed that woodworking learners today must have four abilities: skill, craftsmanship, artistry, and creativity, where "skill" is the emphasis on basic skills development, "craftsmanship" is the emphasis on practical problem solving ability, "artistry" is the cross-disciplinary integration of woodwork via crafts, aesthetics, culture and design, and "creativity" is the transformation of woodworks into products and marketing. It is apparent that woodworking plays a considerably different role in modern society.

This study investigates learners' motivations for acquiring woodworking skills using a question-

naire survey of 50 students taking a woodworking promotion course in a university. The purpose of this survey is to understand the learning motivation of woodworking learners. The results are useful in developing teaching materials and curricula, helping to determine clear objectives for woodwork heritage in Taiwan, and in fostering woodworking talent to continue the tradition.

2. LITERATURE REVIEW

2.1 Woodwork Heritage in Taiwan

Chu (2005) in a study of the development of Taiwan's woodworking industry, found that Taiwan severely lacked materials and craftsman, and relied heavily on trade to import woodwork into Taiwan during the Qing dynasty (before 1895). Many woodworkers came from China to work in Taiwan, expanding the woodwork market and eventually settling down, which laid the foundation for Taiwan's early woodworking period under Japanese rule (1895-1945). Chen (2009) showed that Taiwan's early woodworking techniques were adopted from China and Japan. The demand for temple construction drew woodworkers from Tangshan, China to Taiwan, and they paid particular attention to material selection, mortise and tenon joints², and finishing, spreading exquisite woodworking techniques in Taiwan. During the Japanese Period (1895-1945), Japanese woodworkers often traveled to Lugang and Daxi to aid the development of the local woodworking industry. Therefore, Lugang and Daxi became places of origin for woodworking in Taiwan.

Hung (1993) investigated traditional woodworking in Taiwan and Southern Fukien. Hung identified three methods for learning traditional woodworking: (1) government craftsmen, whose skills were passed on by scholars; (2) skilled workers, generally basic level woodworkers recruited by government craftsmen, and (3) private woodworkers, who passed down their

¹ Original Equipment Manufacturing (OEM): making a part or subsystem that is used in another company's end product. Original Design Manufacturing (ODM): design and manufacture of a product as specified and eventually rebranded by another firm for sale.

² The mortise and tenon joint refer to the technique of adjoining pieces of wood to connect at an angle of 90°. The technique has been used for thousands of years by woodworkers around the world.

skills to family members and apprentices. There is a clear apprenticeship and etiquette, and those that complete training pass on their craft to their own apprentices. Hsu (2013) found that in traditional apprenticeships, masters often use actual cases in work as the basis for apprentices to learn and imitate, and thereby pass on knowledge, experience, and skills. Eventually, they transform this practice into products with economic value. In Taiwan's folk culture, woodwork plays an important role in daily life, and local cultural features are incorporated through the application of woodwork techniques and materials, elevating living standards and aesthetic appeal (Chuang, 2014).

Offshoring of the furniture industry to China and Southeast Asia in recent years (from 1990) has resulted in a severe gap of woodworking talent. Therefore, this study explores the learning motivations of woodworking learners, and further investigates current woodworking talent requirements and development directions, for use as a reference in woodworking curriculum planning.

2.2 Woodwork Design Education

Hsu (2004) investigated the learning process of woodworking education to understand the learning intention of woodworking learners. Research results show that learners have their own preferences in materials selection for woodwork, but generally speaking, they gained knowledge from the course, maintained a good mood while learning, and gained a sense of achievement after successfully completing their woodwork.

In the process of woodwork design education, teachers will interact with students for long periods of time and pass on their professional knowledge and woodworking abilities. However, in modern society, woodworking must involve design and aesthetics to design cultural and creative

products with aesthetic and cultural features. Huang (2015) observed that Taiwan's woodworking industry is at risk of becoming a sunset industry and requires the assistance of creativity and design for transformation. Huang proposed that woodworking learners use mechanical and manual techniques, integrate woodwork partners, elevate cultural attainment and taste, and present works in creative ways to enhance their competitiveness in a globalized market.

In addition, Sun (1999) noted that design education in the vocational education system should not only emphasize skill training and transfer, but also creativity and independent thinking ability. Therefore, this study explores the characteristics of woodworking learners as well.

2.3 Learning Motivation

Learning motivation is an important factor in learning. Students who lack learning motivation often have learning outcomes that fall short of expectations. Hence, it is possible to help students improve their learning outcomes by understanding their learning motivation. Chang (1994) found that learning motivation causes an individual to engage in learning activities, and that such activities bring the individual towards goals designed by the teacher. Kuo (1972) mentioned that in the learning process, learning outcome is affected by attitude, learning motivation, anxiety, and adaptation, in which learning motivation had the greatest effect on learning outcome.

Chuang (2011) studied the correlation between learning motivation and achievement motivation, and found that students of different gender, age, and interests had different learning motivations, and that learning motivation affected learning outcome. Liang (2007) stated that learning motivation benefited self-directed learning, and if learning motivation is increased, students

will not be afraid of difficulties in the learning process and will continue to learn. Given the importance of learning motivation, the purpose of this study is to explore the learning motivation of woodworking learners.

3. METHODOLOGY

The purpose of this study is to understand the learning motivation of woodworking learners. First, students of the woodwork promotion center of a university were invited to complete an open-ended questionnaire. Card sorting was used for induction and analysis of the questionnaires to understand the learning motivation of woodworking learners.

An open-ended questionnaire was designed by three teachers who teach courses on furniture and woodworking practices. The questionnaire is divided into two parts: (1) personal information, including gender, age, marital status, level of education, occupation, and monthly income; and (2) learning motivation, including the purpose for learning woodworking, professional competence development, and benefits of learning woodworking.

To understand the learning motivation of woodworking learners, this study invited 50 students of a woodwork promotion center in a university to be the sample for the questionnaire survey. The questionnaire contained open-ended questions and was administered during the woodworking course. The questionnaire was immediately collected after students completed the course and the effective response rate was 100%.

After collecting the questionnaires, this study used card sorting and statistical methods for analysis. Card sorting is a user centered induction and analysis method that allows un-

derstanding of how people think through data sorting and comparison. Chen (2013) analyzed data for app markets using card sorting, and found that effective data sorting helped users understand a topic faster. Further, the sorting results may be used as a basis for subsequent design and planning. Hence, this study uses card sorting to analyze the results of the questionnaire survey of students in woodworking promotion courses.

There are several steps involved in card sorting. First, the collected data are put through preliminary sorting to form level 1 categories. Level 1 categories with the same meaning are put into the same group (level 2), and then groups with the same conditions or context are put into the same theme (level 3). Participant answers were then compared using frequency analysis to understand their importance in the learning motivation of the students. Finally, a Chi square test on SPSS to cross compare personal information and woodworking learning motivation was performed. The meaning of items that reached the level of significance was then interpreted via frequency analysis in order to understand the relationship between each variable.

4. RESULTS AND DISCUSSION

4.1 Personal Information Analysis

After collecting the questionnaires, this study first sorted the questionnaires by the personal information of woodworking learners, using it as a basis for subsequent comparisons of personal information. Research results are shown in Table 1. Male (48%) and female (52%) participants each accounted for roughly half. The ages of the woodworking learners were widely spread out, ranging from 20 years old or younger to 60 years old or older, the majority being aged 20-40 (58% of all learners). Most learners were single (64%) and were college (university) graduates (62%).

Table 1. Personal information survey

Gender	Age	Marital status	Academic background	Occupation	Monthly income
Male 24 (48%)	<21 years old 4 (8%)	Single 32 (64%)	High school (vocational) 6 (12%)	Student 8 (16%)	<NT\$20,000 (US\$600) 12 (24%)
Female 26 (52%)	21-30 years old 16 (32%)	Married 18 (36%)	College (university) 31 (62%)	Military, civil servant, or teacher 5 (10%)	NT\$20,000 (US\$600) - NT\$30,000 (US\$1,000) 6 (12%)
	31-40 years old 13 (26%)		Graduate school or above 13 (26%)	Labor/Manufacturing 7 (14%)	NT\$30,001 (US\$1,001) - NT\$40,000 (US\$1,300) 7 (14%)
	41-50 years old 8 (16%)		Business and trade 7 (14%)	NT\$40,001 (US\$1,301) - NT\$50,000 (US\$1,600) 12(24%)	
	51-60 years old 6 (12%)		Others 15 (22%)	>NT\$50,000 (US\$1,600) 13 (26%)	
	>60 years old 3 (6%)		Design related 8 (16%)		

The students came from many different occupational categories, with 50% earning more than NT\$40,000 (US\$1,300) and 50% earning less than NT\$40,000 (US\$1,300).

Based on the demographic analysis above, woodworking learners in this study were primarily single people aged 21-50, with a college (university) degree, from all walks of life, and earned an average monthly income of roughly NT\$40,000 (US\$1,300). Hence, woodworking learners possessed a certain level of knowledge, economic ability, and expertise, which made the woodworking learning motivation survey of this study a representative sample.

4.2 Analysis of Woodworking Learning Motivation

This study uses an open-ended questionnaire to understand the learning motivation of woodworking learners, and then analyzes the questionnaires via card sorting, finding learners with the same opinions to learn their perspectives on woodwork heritage. Sorting results are as given below.

4.2.1 Purpose for Learning Woodworking

Three purposes for learning woodworking were found from using card sorting on the questionnaires, including gaining a sense of achievement,

interest in woodwork, and enhancing competitiveness. Contents are as shown in Figure 1.

- (1) Gaining a sense of achievement: The sense of achievement that woodworking learners hope to gain can be divided into three categories, specifically making life more interesting (9) > wanting to make unique furniture (7) > repairing furniture (3).
- (2) Interest in woodwork: The interest of learners in woodwork can be divided into five categories, specifically interest in woodwork (7) > likes woodwork (6) > creates works because of interest (4) > wants to understand woodworking techniques (2) = wants to become familiar with mechanical equipment (2).
- (3) Enhancing competitiveness: Woodworking learners' hopes to enhance competitiveness can be divided into two categories, specifically wanting to develop a second specialty (6) > benefits furniture related work (4).

Based on the frequency analysis, for the level 2 groups woodworking learning motivations are as follows: interest in woodwork (21) > gaining a sense of achievement (19) > enhancing competi-

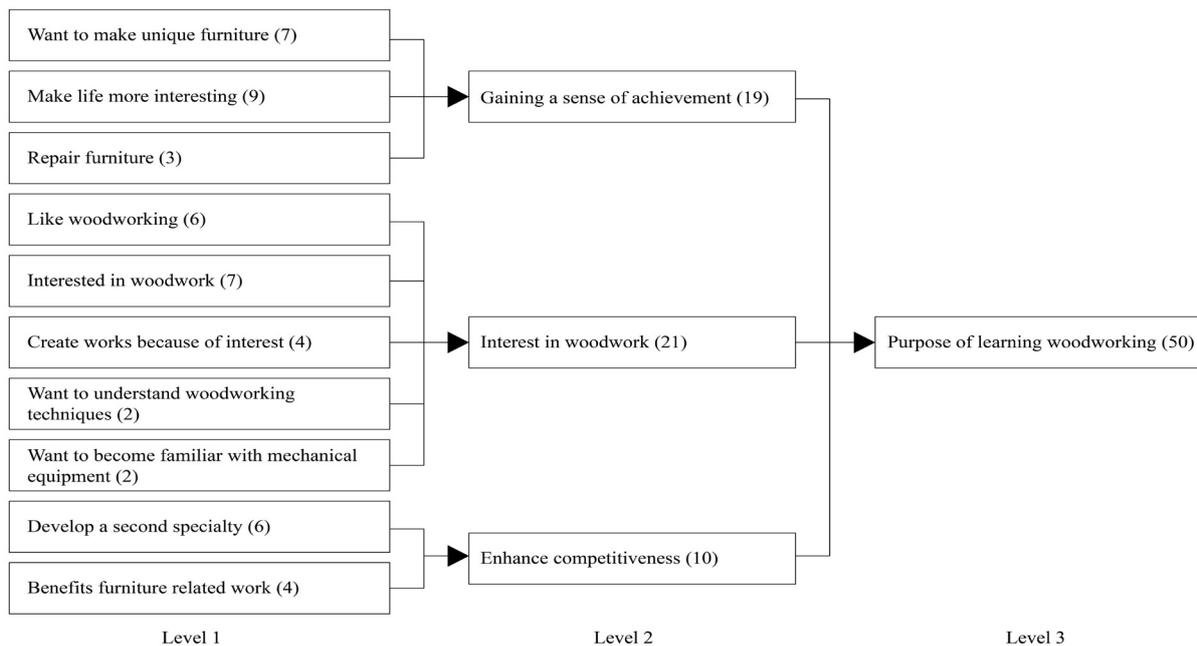


Figure 1. Purpose for Learning Woodworking
Unit: Number of participants

tiveness (10). This shows that personal interest is more important than compensation from using woodworking techniques to make money. The purpose for learning woodworking is no longer to learn a skill for economic survival. The motivation of individual ideals has become greater than the motivation to work for others.

4.2.2 Professional Competence Development

Professional competence development related contents organized through card sorting of the questionnaires can be divided into four categories, specifically furniture design, traditional techniques, mechanical manufacturing applications, and woodworking related knowledge. Contents are shown in Figure 2.

- (1) Furniture design: Aspects of furniture design that woodworking learners want to learn the most: practicality (9) > aesthetics (2) > functionality (1).
- (2) Traditional techniques: Aspects of traditional techniques that woodworking learners want

to learn the most: manual techniques (17) > manual tool use (4).

- (3) Mechanical manufacturing applications: Aspects of machine woodworking applications that woodworking learners want to learn the most: machine use (5) > processing procedures (4).
- (4) Woodworking related knowledge: Aspects of woodworking related knowledge that woodworking learners want to learn the most: knowledge of materials (3) = knowledge of structures (3) > knowledge of technical drawings (2).

Based on frequency analysis, in the development of professional competence by woodworking learners, traditional techniques (21) > furniture design (12) > mechanical manufacturing application (9) > woodworking related knowledge (8).

This shows that in an era of mass produced furniture, woodworking learners still have the desire to design their own furniture using their

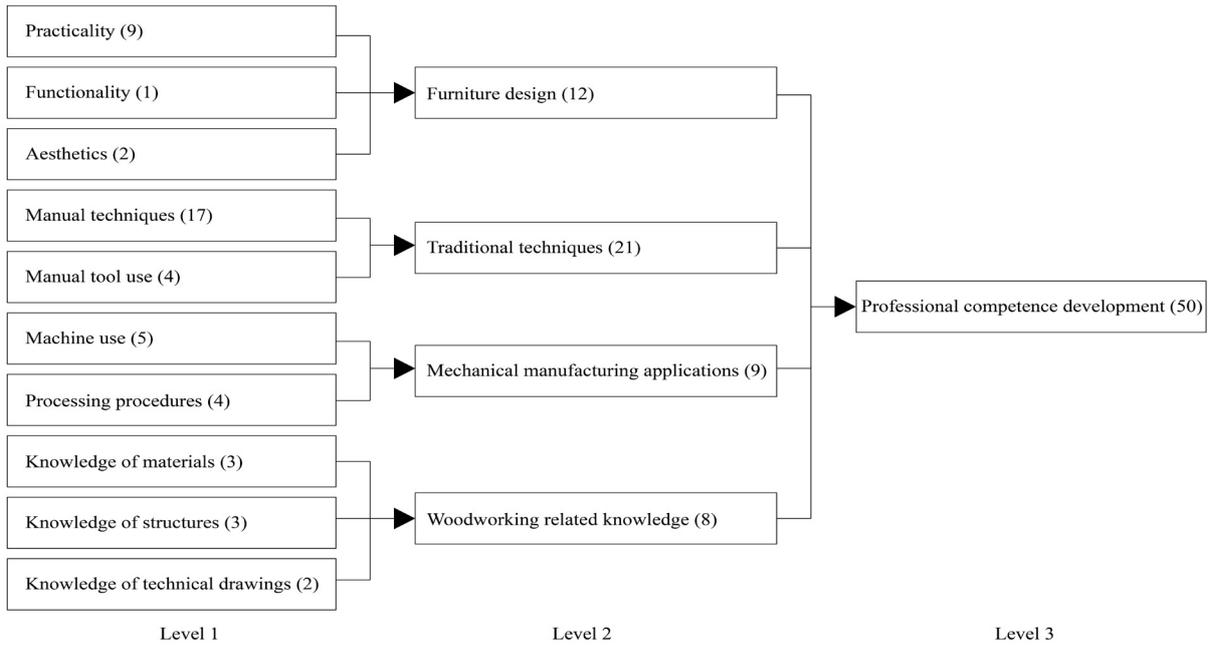


Figure 2. Professional Competence Development
Unit: Number of participants

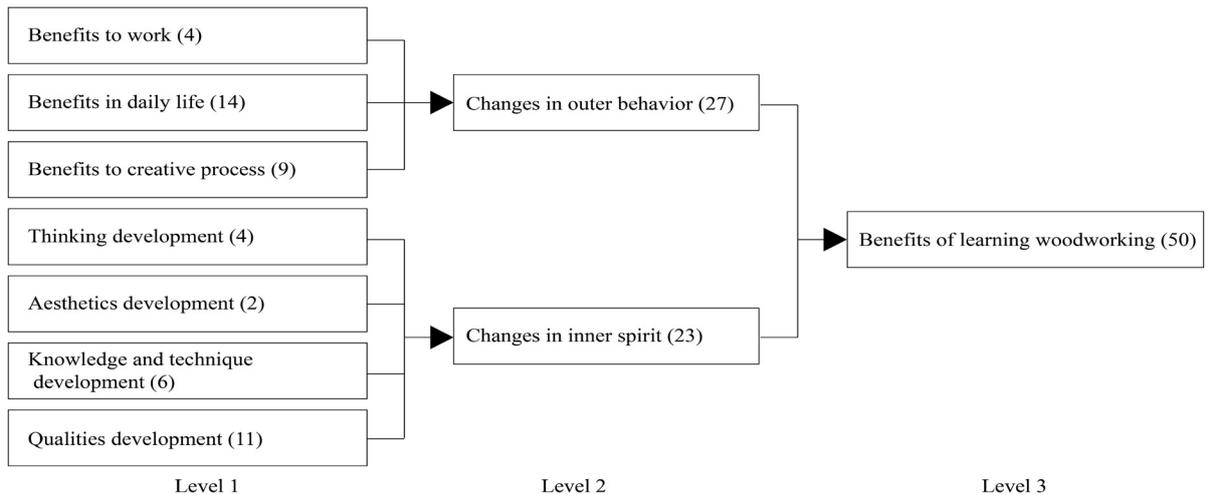


Figure 3. Categories of Benefits of Learning Woodworking
Unit: Number of participants

own capabilities, and mechanical manufacturing and woodworking related knowledge are merely abilities to support their creative process.

4.2.3 Benefits of Learning Woodworking

Two benefits of learning woodworking were found through card sorting of the question-

naires: changes in behavior and changes in attitude. Contents are shown in Figure 3.

- (1) Changes in behavior: learners expected three changes in their behavior: benefits in daily life (14) > benefits to creative process (9) > benefits to work (4).

(2) Changes in attitude: Learners expected four changes in attitude: quality development (11) > knowledge and technique development (6) > thinking development (4) > aesthetic development (2).

Based on frequency analysis, level two groups of professional competence development of woodworking learners consists of changes in behavior (27) > changes in attitude (23). Chang (1989) contended that learning is the process of permanently changing an individual's behavior through practice or experience, and learning woodworking effectively changes learner behavior and attitude.

4.3 Analysis of Variables and Woodworking Learning Motivation

To understand the correlation between the personal information variables of woodworking learners and learning motivation, this study uses the Chi Square Test on SPSS for cross comparison of data. Personal information analyzed in this study includes gender, age, marital status, level of education, occupation, and monthly income, while woodworking learning motivation includes purpose of learning woodworking, professional competence development, and benefits of learning woodworking. Results show a significant correlation between age, occupation, and monthly income with the purpose of learning woodworking (Table 2).

Hence, this study used frequency analysis to explore their internal correlation (Table 3). Results are shown below:

- (1) Age: Younger learners mainly hope to enhance their competitiveness, adults mainly hope to gain a sense of achievement, and retired learners were simply interested in woodworking.
- (2) Occupation: Students aim to enhance their competitiveness, business related workers hope to gain a sense of achievement through learning woodworking, and design related workers were the most interested in woodworking out of all occupations.
- (3) Monthly income: participants with a monthly income of NT\$20,000 (US\$600) or less hope to enhance their competitiveness, while those with a monthly income of NT\$30,000 (US\$1,000) or more hope to gain a sense of achievement.
- (4) Regardless of age, occupation, and monthly income, woodworking learners were all interested in woodworking.

Based on the analysis above, woodworking courses may target different ages, occupations, and monthly incomes. First, furniture skills development courses can be offered to individuals who are younger, students, or from lower income groups to help them enhance their competitiveness. Furniture making courses can be offered to adults, business workers, or higher monthly income groups to enable such individuals to make their own furniture and gain a higher sense of achievement. Furniture design courses can be offered to design-related workers, allowing the group to apply their sense of beauty to furniture design and make creative furniture.

Table 2. Chi Square test of personal information variables on woodworking learning motivation

Statement	Gender	Age	Marital Status	Level of Education	Occupation	Monthly Income
Purpose for Learning Woodworking	.125	.016*	.124	.928	.018*	.014*
Developing Professional Abilities	.400	.780	.966	.939	.614	.913
Benefits of Learning Woodworking	.826	.878	.341	.566	.262	.122

Note: *P<0.05, **P<0.01

Table 3. Frequency analysis of purpose for learning woodworking by age, occupation, and monthly income

Variable	Purpose (number of participants)			Total
	Gaining a sense of achievement	Interest in Woodwork	Enhancing Competitiveness	
Age				
20 years old or younger	-	1	3	4
21-30 years old	4	7	5	16
31-40 years old	8	3	2	13
41-50 years old	5	3	-	8
51-60 years old	2	4	-	6
60 years old or older	-	3	-	3
Occupation				
Student	-	3	5	8
Military, Civil Servant, Teacher	2	3	-	5
Manufacturing Industry	1	2	2	5
Business	6	2	-	8
Design	2	5	2	9
Other	8	6	1	15
Monthly Income				
<NT\$20,000 (US\$600)	1	5	6	12
NT\$20,000 (US\$601) – NT\$30,000 (US\$1,000)	2	3	1	6
NT\$30,001 (US\$1001) – NT\$40,000 (US\$1300)	6	-	1	7
NT\$40,001 (US\$1301) – NT\$50,000 (US\$1600)	6	5	1	12
>NT\$50,000 (US\$1600)	4	8	1	13

5. CONCLUSION

This study explored the learning motivations of 50 students of a woodworking promotion center. A questionnaire survey was used for data collection. Research results indicate that in the purpose of learning woodworking, learners today find that personal interest is more important than compensation from using woodworking techniques to make money. The purpose for learning woodworking is no longer limited to learning skills for economic survival, and has gradually developed towards enhanced living standards. In an era of mass produced furniture, woodworking learners still have the desire to design their own furniture using their own capabilities, and mechanical manufacturing and

woodworking related knowledge are viewed as abilities to support their creative efforts. Finally, learning woodworking effectively changes learner behavior and attitude.

The results show a significant correlation between age, occupation, and monthly income with the purpose of learning woodworking. By age group, younger learners mainly hope to enhance their competitiveness, adults mainly hope to gain a sense of achievement, and retired learners were simply interested in woodworking. By occupation, students aim to enhance their competitiveness, business related workers hope to gain a sense of achievement, and design related workers were the most interested in woodworking out of all occupations. By monthly income,

subjects in the lower monthly income bracket hope to enhance their competitiveness, while subjects in the higher monthly income bracket hope to gain a sense of achievement. Finally, regardless of age, occupation, and monthly income, woodworking learners were all interested in woodworking. This study hopes that survey results of woodworking learning motivation can serve as a basis for planning future woodworking courses.

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