knowledge sharing has been considered as an important process to produce intellectual capital and to increase competitiveness in modern organizations (Ryu, Ho & Han, 2003; Senge, 1997; Van den Hoff & Van Weenen, 2004). In education, knowledge sharing is mainly represented by the behavior that teachers and students use to disseminate their knowledge to others, and also collect knowledge from others. In particular, the sharing of knowledge through face-to-face interaction is an important process of collaborative learning. Many related works in this field have provided evidence that knowledge sharing during collaborative learning can result in reflection and learning, and all participants in the learning can benefit in terms of cognitive gains and positive learning outcomes (see, e.g., Yuen & Majid, 2007).

The business internships for technology university undergraduates can help students to gain career experiences and skills through using collaborative learning. A key factor for successful collaborative learning is active and voluntary sharing of information among students, and between instructors and students. Therefore, such sharing during business internships can help students to answer questions, solve problems, learn new things, and increase their understanding regarding a particular subject (Hogberg & Edvinsson, 1998). Accordingly, in the internship, students are encouraged to share knowledge with other students and their mentors, and hence, they can strengthen their learning effects preparing for future employment.

Students attending internships in insurance companies to learn knowledge, skill, and experiences of insurance sales advisor usually require considerable knowledge sharing. This is because most of these skills and experiences represent tacit knowledge, and a powerful way to disseminate and acquire such knowledge is to share one’s thoughts and feelings with others (Nonoka & Takeuchi, 1995). This sharing is an excellent way to demonstrate the mentor ‘and interns’ specific knowledge. Through dialogue, discussion and experience sharing, knowledge can be amplified or deepened (Wasonga & Murphy, 2006).

Given the above, it can be seen that knowledge sharing has the potential to enhance learning outcomes during internships in insurance companies. However, only a few studies have been reported on students’ learning from the perspective of knowledge sharing (Yuen & Majid, 2007). In particular, no studies consider the process in a business internship practicum. Therefore, in this work, we explore undergraduate students’ knowledge sharing behavior during internship in insurance companies. To this end, we concentrated on both personality factors and contextual factors that in theory are salient antecedents affecting the student’s propensity towards knowledge sharing. When reflecting on the insurance industry, it is considered that a good advisor of insurance sales should have altruistic and self-efficacy attributes to offer enthusiastic and professional assistance to their customers. Accordingly, in our work, the students attending internships in insurance companies are expected to learn skills, experience and attitudes from
sales advisors in order to prepare for their future employment. Hence, this study takes altruism and self-efficacy as the personality factors to investigate their effects on students’ knowledge sharing behavior during their business internship. Besides, interactions between mentors and interns would enhance or weaken internship outcomes. So we also aim to find how the contextual factor of a Mentor-Intern (M-I) interaction can moderate knowledge sharing behavior.

Specifically, this research has the following purposes:

- Understanding the students’ knowledge sharing behavior during insurance business internship;
- Exploring the impact of altruism and self-efficacy on students’ knowledge sharing behavior during insurance business internship;
- Identifying the moderating effect of M-I interaction on the above impact; and
- Providing research outcomes and suggestions as the references for school administrative units, internship units and future studies.

**Literature Review and Hypotheses**

**Business Internship**

The insurance education of universities of Technology aims at educating students to be professionals with advanced practical skills of sales and management. Therefore, it is essential to establish the link between insurance departments of universities and insurance industries. For this reason, students participating in business internships in insurance companies enhance their learning effects of insurance education.

The business internship practicum means that undergraduates in school attend practical training in industry for a period of time (Rothman, 1984). As indicated by Rompelman and Verbies (2002), the educational goals of business internship practicum are related to the following aspects:

- Acquiring insight into profession;
- Learning to express and communicate in human relations; and
- Learning to apply as well as broadening technical knowledge and skills.

From the above, it can be seen that the internship can provide students an opportunity for the practical application of academic studies. With that, students can learn to apply their knowledge and skills in a real-life situation. Hence, the experience of internship will help them to adjust themselves to the future employments.

In our work, the business internship is for junior undergraduates (i.e., students of the next to the last years) participating in internship programs in life insurance companies during the summer vacation. These students came from three classes of the Department of Insurance at the Chaoyang University of Technology in Taichung, Taiwan. They were divided into 14 units of sales offered by eight insurance companies and attended practical training for five days in a week, for four weeks from July 2 to 27, 2007.

**Knowledge Sharing**

Knowledge sharing is one of the key mechanisms by which knowledge transfer can take place within a business internship. Specifically, Senge (1997) defines knowledge sharing as the capability to assist others to develop efficiency in action, in which interactions are involved to transform knowledge to an action capability. Ryu et al. (2003) consider knowledge sharing as the behavior that a person disseminates his (or her) knowledge to the others within his (or her) organization. The above view sees knowledge sharing only as knowledge offering, Van den Hoff and Van Weenen (2004) take a wider view saying that knowledge sharing includes not only knowledge offering, but also knowledge collecting. Knowledge sharing can be considered an important process in the production of intellectual capital, and a way to increase competitiveness in modern organizations. However, Davenport and Prusak (1998) argue that sharing knowledge is often unnatural because people think that their knowledge is valuable and important, and that hoarding knowledge and being suspicious about knowledge from others are natural tendencies. Therefore, it is important to understand the factors that are effective in facilitating and encouraging knowledge sharing.

In this respect, two issues are involved in our study: personality factors and contextual factors. Previous research suggests that the personality factors affecting knowledge sharing behavior mainly consist of altruism, reciprocity, self-efficacy and big five personalities (Bock & Kim, 2002; Davenport & Prusak, 1998; Hsu, Ju, Yen & Chang, 2007; Hung & Hsu, 2006; Wu & Lin, 2007). For the reasons given above, the personality factors of altruism and self-efficacy of sales advisors were selected as independent variables in our work. In addition, the M-I interaction of the contextual factors was chosen to be a moderated variable. Accordingly, Figure 1 depicts our contingency model of students’ knowledge sharing during business internship.

![Figure 1. A contingency model of students’ knowledge sharing during internship](image)

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Altruism and Knowledge Sharing

Altruism is a personality and psychological factor that affects individual behavior. Rushton (1980) defines altruism as regard for the interest of others. Chattopadhyay (1999) notes that altruism is personally costly behavior that benefits others. Therefore, here it is considered that altruism is a personal attribute of helping others, without any anticipated compensation (Wu & Lin, 2007).

The relationships between altruism and knowledge sharing is considered here. Constant and Sproull (1994) suggest that information sharing is a kind of pro-social behavior. Employees are more likely to share information when they incline to engage in pro-social transformation, that is, when they wish for good outcomes not only for themselves but also for other employees or for the organization more generally. Davenport and Prusak (1998) comment that people with altruism are more likely to share their knowledge, and Wu and Lin (2007) say that information workers’ propensity for altruism positively influence their knowledge sharing attitude. Thus, we suggest that altruism may be a good predictor of students’ knowledge sharing activities during internships. Hence, we propose:

- **Hypothesis 1**: Business internship students with high levels of altruism will be more likely to engage in knowledge sharing behavior.

Self-Efficacy and Knowledge Sharing

Self-efficacy, part of Bandura’s Social Learning Theory, refers to a person’s belief in his or her own capability to perform a specific task (Bandura, 1982). In academic settings, students with strong self-efficacy tend to be more achievement- and mastery-oriented, and willing to persevere at a task longer in an effort to successfully reach their goal (Dixon & Schertzer, 2005).

As shown in above, self-efficacy is a form of self-evaluation that influences decisions about what behaviors to undertake, the amount of effort and persistence to put in when facing with obstacles, and finally, the mastery of the behavior (Hsu, Ju, Yen & Chang, 2007). Several researchers have employed self-efficacy to examine its effect on knowledge sharing intentions. For example, Bock and Kim (2002) propose that self-efficacy be treated as a major factor in terms of self-motivation about knowledge sharing. Their findings suggest that an individual’s judgment of his or her contribution to organizational performance has positive impact on knowledge sharing. Hsu et al. (2007) employed social cognitive theory to explore knowledge sharing behavior within virtual communities. They report that self-efficacy is positively related to knowledge sharing behavior. Thus, we propose here that self-efficacy is a good predictor for students’ knowledge sharing during internship.

Hence, we propose:

- **Hypothesis 2**: Business internship students with high levels of self-efficacy will be more likely to engage in knowledge sharing behavior.

Moderating effect of M-I Interaction

The literature suggests that behavior is affected by both personality and the environment (Bandura, 1982). For the former (personality), we have above proposed two important factors for knowledge sharing behavior: altruism and self-efficacy. In what follows we discuss the environment factor (i.e., contextual factor) of M-I interaction that might moderate the relationship between personality and knowledge sharing behavior.

Interaction includes many behaviors - communicating, cooperating and chatting among people, and interactions like these are key factors affecting knowledge sharing (Nonoka & Takeuchi, 1995; Wan, Yang & Wu, 2006). The knowledge we share could be in the form of explicit knowledge, which can be captured and documented, or tacit knowledge in the form of skills and competencies. Unlike explicit knowledge, tacit knowledge is personal and can only be shared through socialization and interaction which often requires face-to-face communication. In many cases, tacit knowledge is transferred through observation, imitation, practice, and interaction with the environment (Yuen & Majid, 2007). Therefore, good interactions can facilitate tacit knowledge sharing.

As a special case of the above, the M-I interaction represents interaction between mentors and interns during an internship. In this work, we consider the two types of M-I interaction. The first type suggests that there are different mentors training all interns for a given sales unit, for production knowledge and sales skills, and the second that there is only one mentor caring for one or two interns and sharing his or her work experience with them. Throughout the M-I interaction, the knowledge, skills and experiences obtained from the practical training, which most belong to tacit knowledge, can be easily acquired and shared. Thus, we propose that M-I interaction may be a contextual factor affecting students’ knowledge sharing during internship.

In the previous section, we proposed that people with high levels of altruism or self-efficacy are more likely to share their knowledge. However, a person cannot exhibit knowledge sharing behavior without interaction within an environment. Cabrera, Collins and Salgado (2006) point out that a person will be more inclined to exchange knowledge with others to obtain the approval from their supervisors. Hsan-Hou’s study also finds that a person without the sharing personality is willing to share knowledge with others if they have good
interaction relationships (Wu & Lin, 2007). Therefore, we think that interns of lower altruism or self-efficacy will be likely to engage in knowledge sharing only if they have good interactions with their mentors. Underlying our rationale above, it is suggested that M-I interaction is an important factor that might enhance, weaken or alter knowledge sharing behavior. That is to say, the M-I interaction may moderate the relationship between altruism and knowledge sharing behavior, and between self-efficacy and knowledge sharing behavior. Hence, we provide the following two additional hypotheses:

- **Hypothesis 3**: M-I interaction will moderate the relationship between altruism and knowledge sharing behavior.
- **Hypothesis 4**: M-I interaction will moderate the relationship between self-efficacy and knowledge sharing behavior.

**Research Design**

This study employed a investigative design method to test our hypotheses. More specifically, we purposefully selected interns to complete our questionnaires after their business internships. With the questionnaires collected, we analyzed and examined the results with appropriate statistical techniques.

**Sample**

The participants of this study were 173 junior undergraduates from three classes of the Department of Insurance at the Chaoyang University of Technology in Taichung, Taiwan. They participated in a business internship offered by 14 units of insurance sales. In total 173 questionnaires were collected, of these there were 158 complete questionnaires obtained, representing an effective response rate of 91%. Among these retained questionnaires, 77% were female and 23% male.

**Measurement**

The investigative design method utilized a 5-point Likert scale (fully agree, agree, average, disagree, fully disagree) scored from 5 to 1. The research instrument was divided into four categories: altruism, self-efficacy, M-I interaction, and knowledge sharing behavior. The validity for each category was computed using Cronbach’s alphas which ranged from 0.87 to 0.93, which represents good scale reliabilities (Table 1). For reference, the four categories of our instrument are summarized as follows, while all items of the instrument are provided in Appendix A.

- **Altruism**: this scale contained eight items developed from Chattopadhyay (1999), and the Cronbach’s alpha value was 0.89.
- **Self-efficacy**: this scale contained seven items developed from Chen, Gully and Eden (2001), with a Cronbach alpha value of 0.87.
- **M-I interaction**: this scale contained nine items developed from Wang, Yang and Wu (2006), and the Cronbach’s alpha value was 0.93.
- **Knowledge sharing behavior**: this scale contained seven items developed from Van den Hoff and Van Weenen (2004), and the Cronbach’s alpha value was 0.91.

**Data Analysis**

The Statistical Package for the Social Sciences (SPSS 12.0) was used to analyze these data. First, we use descriptive statistics and correlations to investigate the relationships of variables. Next, the reliabilities for each scale’s were computed. Finally, hierarchical regression analysis was used to examine the potential impact of altruism and self-efficacy on student’s knowledge sharing behavior, and a moderated regression analysis utilized to examine the moderated effects of M-I interaction.

**Results and Discussion**

We report here the results using descriptive statistics, correlations, and scale reliabilities for the variables identified in Table 1. As shown in this table, the means of M-I interaction and knowledge sharing behavior are all above 4. This suggests that the learning outcomes of business internship practicum exhibit substantial interaction and knowledge sharing behavior. In addition, it also suggests that a moderately significant relationship between all variables with correlation coefficients with the range of $r = 0.42$ to 0.61.

**Table 1.** Descriptive statistics and correlations in a study of knowledge sharing for Department of Insurance students from Chaoyang University of Technology (n=158) *

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>s.d.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Atruism</td>
<td>3.84</td>
<td>0.49</td>
<td>(0.89)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Self-efficacy</td>
<td>3.85</td>
<td>0.45</td>
<td>0.55***</td>
<td>(0.87)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>M-I interaction</td>
<td>4.15</td>
<td>0.56</td>
<td>0.44***</td>
<td>0.45***</td>
<td>(0.93)</td>
</tr>
<tr>
<td>4</td>
<td>Knowledge sharing behavior</td>
<td>4.11</td>
<td>0.50</td>
<td>0.61***</td>
<td>0.42***</td>
<td>0.50***</td>
</tr>
</tbody>
</table>

*Scale reliabilities (Cronbach’s alpha) appear on the diagonal. *** p< 0.001

Hypotheses 1 and 2 were tested using hierarchical regression analysis and these findings are provided in Table 2 (Appendix B). In Model 1 of this table, we
enter the dependent variables of altruism and self-efficacy. The results suggest that altruism is significantly positively related to student’s knowledge sharing behavior ($\beta=0.47, p<.001$). Such a finding supports Hypothesis 1, but does not support Hypothesis 2. In addition, the results also indicate that students with high levels of altruism are more likely to engage in knowledge sharing.

In the same table, the results of Hypotheses 3 and 4 were examined via moderated regression analysis, and are given in Model 2. In this model, we first entered the dependent variables (i.e., altruism and self-efficacy) and the moderated variable (i.e., M-I interaction). Then, we added the interaction terms for altruism and M-I interaction, and those for self-efficacy and M-I interaction. The results of this model indicate that the interaction effect for self-efficacy and M-I interaction is significant for knowledge sharing behavior ($\beta=2.38, p<.05; \Delta R^2=0.03, p<.001$), which supports Hypothesis 4, but not Hypothesis 3. Thus, in Figure 2 (Appendix B), we show the significant interaction effect that is consistent with the predictions of Hypotheses 4. The effect here is that students with lower self-efficacy exhibit more knowledge sharing behavior in a higher M-I interaction environment than that in a lower M-I interaction environment, (see left side of Figure 2). Accordingly, although the self-efficacy does not appear to significantly affect students’ knowledge sharing behavior during the internship, higher M-I interaction can facilitate knowledge sharing behavior of students who have low self-efficacy.

The research findings provide here are different from those of other work. This is possibly because other related work involved different subjects with different seniority. For example, the subjects for the business students of Bock and Kim (2002) and Hsu et al. (2007) were employees that had worked in their companies for a considerable length of time. With this background, the studies show that self-efficacy is positively related to employees’ knowledge sharing behavior. On the other hand, our subjects are interns whose internships were only of one month’s duration. Hence it is perhaps not surprising that in this work we find that self-efficacy is not significantly related to interns’ knowledge sharing behavior. Specifically, when compared with employees in companies, interns are placed in a new environment and required to make contact with unfamiliar mentors. In such a situation, even interns with high self-efficacy are not likely to share their knowledge with others. However, if mentors engage in friendly interactions with interns, this may facilitate knowledge sharing behavior of interns of lower self-efficacy. Therefore, good M-I interactions during internship are particularly important in the internship.

Our model of intern’ knowledge sharing behavior was tested with the students of insurance department who practice in insurance companies. However, it remains unclear if this model would be valid with the interns of difference departments. In addition, the M-I interaction is the only moderated variable examined in our model. The interaction between intern and intern also could be considered as a moderated variable. Finally, different cultures of practicing companies (and indeed students) may also affect interns’ knowledge sharing behavior, which could be explored in the future.

Conclusions
During the last few years, technological and vocational education in Taiwan has been substantially developed. Universities of technology aim to develop professional personnel with advanced skills in the fields of technology and management. Therefore, to further promote the quality of insurance education, it is essential to establish the link between insurance departments of universities and insurance industries. For this reason, students of insurance departments in technology universities participate in internships in insurance industries that are intended to improve learning outcomes in insurance education.

However, an important factor in successful business internship is the voluntarily sharing of knowledge among mentors and interns. Therefore, based on a review of the literature on knowledge sharing and related subjects, we identified what factors may be effective in facilitating and encouraging knowledge sharing behavior. Hence, this study presents a model of students’ knowledge sharing during their internships, and analyzes the data from 158 junior undergraduates who attended an internship in insurance companies.

Our findings suggest that altruism is positively related to students’ knowledge sharing behavior, and students of lower self-efficacy will exhibit more knowledge sharing behavior by means of higher M-I interaction. Accordingly, we suggest that the course development within schools should foster students’ altruistic attributes, and the companies should strive to create an environment that fosters M-I interaction during internships. To this end, courses about service such as labor education and community service, and courses using with cooperative learning strategies all could be used to enhance students’ altruistic attributes before engaging in business internships. Moreover, mentors with good communication and leadership abilities should be selected for interns during the business internship in which good M-I interaction might be expected to enhance students’ knowledge sharing behavior and to promote learning. Finally, we suggest that our findings and suggestions can help stimulate related research to further examine the antecedents and consequences of intern’s knowledge sharing behavior.
References

APPENDIX A

Items used in a study of knowledge sharing for Department of Insurance students from Chaoyang University of Technology (n=158)

Altruism
- I offer emotional support to other interns within my practice company in times of trouble.
- I encourage other interns within my practice company to speak up at meetings.
- I try to motivate other interns within my practice company to do their best.
- I encourage other interns within my practice company to learn new skills and techniques.
- I help other interns within my practice company even though it is not required.
- I am always available to help other interns within my practice company to do their tasks efficiently.
- I help other interns within my practice company to work through their personal or professional problems.
- I help other interns within my practice company to think for themselves.

Self-efficacy
- Compared to other interns within my practice company, I can do most tasks very well.
- Even when things are tough, I can perform quite well.
- I am confident that I can perform effectively on many different tasks.
- I will be able to successfully overcome many challenges.
- In general, I think that I can obtain outcomes that are important to me.
- When facing difficult tasks, I am certain that I will accomplish them.
- I will be able to achieve most of the goals that I have set for myself.

M-I interaction
- Mentors don’t express their defenses or distrust to me, when they communicate with me.
- Mentors don’t interrupt my opinions, when they communicate with me.
- Mentors will record and repeat what I said, when they communicate with me.
- Mentors don’t depart from our subjects, when they communicate with me.
- Mentors can understand and give feedback, when they communicate with me.
- Mentors will listen carefully to my problems to discover the truths.
- Mentors always give me reasonable answers for my problems.
- Mentors always respond kindly to my opinions.
- I think what mentors talk to me is honest and reliable.

Knowledge sharing behavior
- When I’ve learned something new, I tell other interns within my practice company about it.
- When they’ve learned something new, other interns within my practice company tell me about it too.
- Knowledge sharing with other interns within my practice company is considered a normal thing.
- I share the information I have with other interns within my practice company, when they asked me.
- I share my skills with other interns within my practice company, when they asked me.
- Interns within my practice company tell me what they know, when I ask them about it.
- Interns within my practice company tell me what their skill are, when I ask them about it.
## APPENDIX B

### Table 2. Results of regression analysis for knowledge sharing for Department of Insurance students from Chaoyang University of Technology (n=158) *

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th></th>
<th>Model 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\beta$</td>
<td>S.E.</td>
<td>95% confidence interval</td>
<td>$\beta$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lower Bound</td>
<td>Upper Bound</td>
</tr>
<tr>
<td>altruism</td>
<td>0.47***</td>
<td>0.08</td>
<td>0.32</td>
<td>0.63</td>
</tr>
<tr>
<td>self-efficacy</td>
<td>0.04</td>
<td>0.08</td>
<td>-0.12</td>
<td>0.21</td>
</tr>
<tr>
<td>M-I interaction</td>
<td>0.27***</td>
<td>0.06</td>
<td>0.12</td>
<td>0.37</td>
</tr>
<tr>
<td>altruism * M-I interaction</td>
<td>0.26</td>
<td>0.13</td>
<td>-0.22</td>
<td>0.29</td>
</tr>
<tr>
<td>self-efficacy * M-I interaction</td>
<td>2.38*</td>
<td>0.14</td>
<td>0.06</td>
<td>0.62</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.44</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj-$R^2$</td>
<td>0.43</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Delta R^2$</td>
<td>0.44***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$F$</td>
<td>40.09***</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Standardized regression coefficients are shown. * $p < 0.05$  ** $p < 0.01$  *** $p < 0.001$

![Figure 2. Statistically significant interactions between M-I and knowledge sharing for Department of Insurance students from Chaoyang University of Technology (n=158)](image-url)