The use of the 40mm table tennis ball by the University of the Philippines varsity table tennis team

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Abstract The study investigated the use of the 40mm table tennis ball as experienced by the University of the Philippines Varsity Table Tennis Team during the 1st U.P. 40mm Ball Table Tennis Championships held last October 18 to 20, 2000, the first official local tournament using the 40mm ball. It also determined the significant effect of the new ball on the performance for competitive table tennis players.

Thirty-one players (21 male and 10 female) were given a 59-item questionnaire on the following areas: 1) Service, 2) Receive, 3) Offense, 4) Defense, 5) Individual Styles and Techniques, 6) Tactics and Strategies, and 7) Others. The responses were rated on a 5-point Likert Scale and analyzed using the descriptive method.

The results showed that 71% of the respondents improved their game mainly because the ball is slower and anticipation is easier. 67.7% prefer the 40mm ball to the 38mm ball while 83% could easily adjust to using the 40mm. The T-test showed that there is a significant difference between male and female players at $p<0.05$. No significant difference was noted in power, speed, agility or timing. Varsity level players who are less skillful than the regional and international competitors considered the 40mm ball most effective in defense since the ball is slower. The regional and international level players, however, experienced a big difference in terms of the speed of the ball in general. Due to the bigger diameter and weight of the 40mm ball, physiological factors were of significant importance.

In conclusion, the data indicated that Filipino table tennis players welcome the 40mm ball given the proper time for adjustments. This study is still under way to find more conclusive results.

(*Key words: table tennis ball, perception/experience, playing style, skill level*)

1 Introduction

1.1 Background of the study

Long before the sport of table tennis originated, the fascination of ball games started more than two thousand years ago as shown in descriptive literature and

illustrations from Greek and Roman documents. The quality and composition of the very early balls were relatively crude (Crayden, 1995). Little by little with the advent of technology, the use of balls in any sport has improved tremendously. It has influenced the need to enhance performance in terms of its physical, technical and psychological components.

Tracing back in its history, it is evident that table tennis started as a parlor game and was customarily played on a dining room table (Tamasu, 1995). In recent years, there has been a rapid growth and development in the sporting world of table tennis. Replacing rubber and cork balls by the celluloid ball in about 1900 marked a milestone in the development of table tennis (Gurney). These balls were accepted by the International Table Tennis Federation (ITTF) in 1926 and rules were made with regards to their size, weight and color. These rules existed until the proposal of increasing the diameter of the ball was made. The development and manufacture of balls with higher quality influenced the sport in terms of its techniques, tactics and styles.

Table 1 shows a comparison of changes made from the 38mm ball to the 40mm ball. The use of the 40mm ball took effect last October 1, 2000 (ITTF, 2000).

Table 1. Characteristics of the 38 and 40 mm Balls.

DIAMETER	WEIGHT	MATERIAL	COLOR
38mm	2.5 grams	CELLULOID OR SIMILAR PLASTIC MATERIAL	WHITE, ORANGE AND MATT
40mm	2.7 grams	CELLULOID OR SIMILAR PLASTIC MATERIAL	WHITE, ORANGE AND MATT

Some issues have been raised on whether these changes will provide better results in the promotion of the sport. After long deliberations in the Biennial General Meeting (BGM) where every member country of the ITTF presented their views on certain proposals, the members voted on whether to approve the change. (WTTC, 1999). Its implementation at present will prove its acceptance and role in improving its users' performance.

This researcher personally witnessed this transition during the BGM of the 44th World Table Tennis Championships in Manchester, England in April, 1997. This experience prompted the researcher to pursue this study, which he firmly believes will not only improve the sport in general but will also enhance the performance of our local table tennis players.

1.2 Statement of the problem

This study investigated how local competitive table tennis players perceived

and experienced the use of the 40mm table tennis ball in relation to their performance in actual table tennis competitions. At this stage, the possible effects of the 40mm ball on the performance of our local table tennis players had not been generally assessed. Coaches and athletes still had to determine whether the new ball had a significant effect on the performance of most of our elite athletes. It was also valuable to know whether the ball would have positive potential long-term effects as our players skillfully adjust their playing strokes to it.

Specifically this study;

1. identified the experiences/perceptions of the University of the Philippines varsity table tennis players in the use of the 40mm ball according to gender, competition level and playing styles; and

2. determined the significant differences between male and female players in terms of their general experiences and their responses in the different categories of service, receive, offense, defense, individual styles and techniques, tactics and strategies, and others

1.3 Hypotheses

1. There is no significant difference between male and female players in terms of their general experience in the use of the 40mm ball.

2. There is no significant difference in power, speed, timing or agility in the use of the 40mm ball.

1.4 Significance of the study

This study serves to guide local table tennis players on how to make the necessary adjustments in their game strategies and techniques using the 40mm ball. Awareness of the general effects or changes in the game arising from the use of the 40mm ball will bring about conscious effort on the individual to adjust his game strategies and tactics or strokes. This will help players learn how to overcome whatever difficulties they may encounter with the use of a bigger diameter ball.

Providing the coaches with such baseline data will help them redesign their training programs relative to the use of the 40mm ball in terms of its physical, technical and psychological aspects. It will help them realize and finally accept the reasons behind the approval and implementation of the 40mm ball.

With its last October 1, 2000, this study is a venue to disseminate information on the new rule among the masses, especially in the education of students who are taking up Physical Education courses.

Finally, it will motivate and guide our local sports officials, especially our national sports associations, clubs and scholastics associations, to come up with a more comprehensive program starting from the grass roots level all the way up to the elite level. The problem of our local players when they compete against foreign players has always been the lack of time to anticipate the incoming ball. Since the 40mm ball will be slower this problem can now be dealt with. Such new changes in the rule will provide better chances for local players to be at par with our neighboring ASEAN countries who are potentials for world caliber national team someday.

1.5 Scope and delimitation of the study

This study was confined to a preliminary investigation on how Filipino competitive table tennis players perceive the use of the 40mm ball. Only the perception and experience of the respondents were taken into consideration since the study was the first ever to be conducted. Respondents to a questionnaire are players who competed in the 1st U.P. 40mm Ball Table Tennis Championships held last October 18-20, 2000. This was the first official tournament endorsing the use of the 40mm ball, and was sponsored by both the College of Human Kinetics, Diliman, Quezon City and the Table Tennis Association of the Philippines. Gender, competition level and playing styles were considered in seeking differences in the experience. Experiences on the effect of the ball on the following were also studied: service, receive, offense, defense, individual styles and techniques, and tactics and strategies.

1.6 Definition of Terms

1. Allround player — a player who equally plays both offensive and defensive styles
2. Defensive player — a player who predominantly plays a defensive game rather than an offensive game
3. International level — skill level of players who have competed in international competitions such as the South East Asian (SEA) Games, Asian Games, and World Championships
4. National level — skill level of players who are of national caliber (consistent champions in local and regional competitions) and who belong to the national training pool but have not yet competed internationally
5. Offensive player — a player who is predominantly an attacking player, rather than a defender
6. Recreational level — skill level where players train only during their spare time, not regularly participating in competitions
7. Regional level — skill level where players represent their respective regions in regional as well as national meets such as the Palarong Pambansa, and Games
8. Table Tennis Ball — a ball, made of celluloid or similar plastic material, is white or orange and matt in color and has a diameter of 40mm and a weight of 2.7 grams (took effect October 1, 2000)
9. Varsity level — skill level where players have represented only the school in high school and collegiate competitions like the University Athletic Association of the Philippines (UAAP), National Collegiate Athletic Association (NCAA) and the State Colleges and Universities Athletic Association (SCUAA).

2 Methodology

2.1 Research design

The descriptive method of research was applied to this study. The experiences and perceptions of the respondents on the effectiveness of the use of the 40mm ball were fully documented. Differences among gender, competition levels and

playing styles were considered to provide a comparative empirical set of data that will further explain the degree of effectiveness from the point of view of the players.

2.2 Description of subjects

The subjects of this study were the thirty-one members of the University of the Philippines Varsity Table Tennis Team (21 males and 10 females) who participated in the in the 1st U.P. 40mm Ball Table Tennis Championships held last October 18-20, 2000. This event is said to be the first major tournament that they had participated in using the 40mm ball since it took effect on October 1, 2000. Table 2 shows the demographic data on the subjects according to gender, competition level and playing styles.

Table 2. Demographic profile of subjects.

	Subject (N)	Percentage (%)	Age Range (Years)
Total	31	100%	17-24
Male	21	67.74%	17-23
Female	10	32.26%	17-24
Competition Level			
Varsity	14	45.16%	17-22
Regional	9	29.03%	17-23
International	8	25.81%	17-24
Playing Styles			
Offensive	9	29.03%	18-23
Defensive	1	3.23%	18
Allround	21	67.74%	17-24

2.3 Description of research instruments

The principal instrument used in gathering data was a questionnaire constructed and developed by the researcher. A five-point Likert Rating Scale (1=not at all, 2=slightly, 3=moderately, 4=much, 5=very much) was adopted calling for the player to make a response regarding his/her perception on the use of the 40mm table tennis ball in an actual table tennis match. It was constructed to obtain relevant information related to their experience in the following areas (categories): 1) Service, 2) Receive, 3) Offensive, 4) Defensive, 5) Individual Styles and Techniques, 6) Tactics and Strategies, and 7) Others (power, speed, timing and agility).

The respondents further answered a set of questions describing their general

evaluation of and observations on the use of the 40mm ball. Interviews were conducted at random among selected respondents to give more light on how and why such responses in the questionnaire were elicited.

2.4 Procedure of data collection

The researcher-constructed questionnaire was validated by expert inspection: Copies of the questionnaire were handed out to people such as professors and experts in the field of table tennis. These provided valuable analysis about the questionnaire layout, content, expression and significance of the items, and either added or deleted items that they felt were relevant to the study.

The study started with the researcher explaining to the players the purpose of the survey, encouraging them to answer all questions seriously and assuring the respondents that the information provided by them would held in strict confidentiality.

2.5 Statistical analysis

Descriptive analysis was applied to this research. Frequency, means and standard deviations were employed to quantify the data on the different variables and categories. Statistical differences were taken by means of the T-test to differentiate responses between male and female respondents as well as among power and speed; and timing and agility.

The respondent's attitude was determined by adding the scores of the statements. Positive and negative statements in the questionnaires were important in order to express a more favorable attitude by the respondent. Negative statements were reverse scored by subtracting the recorded score from a value of one more than the highest possible response value. The answers of the respondents were established through the 5-point Likert Scale representing five positions or perspectives: Very much—5, Much—4, Moderately—3, Slightly—2, Not at all—1. These values represent the favorability or acceptability of the use of the 40mm ball by the participants. It also reflects the level at which the performance of the participants was affected by its use.

3 Presentation and analysis of data

3.1 Overall experience in the use of the 40mm ball

Table 3 shows the overall descriptive data from the responses to the questionnaire that was administered.

In general all competitors experienced the use of the 40mm ball as having moderately affected their performance (mean = 3.29). This further means that to a certain degree they are in favor of and have accepted the use of the 40mm ball. Thus, they are able to adjust/adopt to its use.

Table 3. Descriptive statistics on the experience of using the 40mm ball according to gender, competition level and playing styles.

VARIABLE	SUBJECTS (n)	MEAN OF SCORES	MAX.	MIN.	STANDARD DEVIATION
Gender					
Male	21	3.4	4.02	2.73	0.38
Female	10	3.07	3.32	2.63	0.21
Overall	31	3.29	4.02	2.63	0.36
Playing Styles					
Offensive	9	3.38	3.9	2.73	0.39
Defensive	1	3.07	3.07	3.07	---
Allround	21	3.27	4.02	2.63	0.36
Competition levels					
Varsity	14	3.32	3.9	2.73	0.37
Regional	9	3.27	4.02	2.88	0.36
International	8	3.26	3.9	2.63	0.40

To give more light to the results presented above, the mean for each category in the questionnaire was also analyzed (Table 5).

The mean were highest in the category of defense and lowest in the individual styles and techniques. The speed of the 40mm ball being slower would enable the receiver to return it more effectively. With the many variations open to the players with different techniques, it will take more time to adopt to a good style compatible to the 40mm ball.

Table 4. Means of responses per questionnaire category.

CATEGORY	TOTAL of MEANS	MEAN /CATEGORY
SERVICE	96.7	3.12
RECEIVE	102.52	3.31
OFFENSE	103.55	3.34
DEFENSE	108.58	3.5
INDIVIDUAL STYLES AND TECHNIQUES	89.02	2.87
TACTICS AND STRATEGIES	99.34	3.21
OTHERS	105.2	3.39

3.2 Experience according to gender

Table 5 shows the significant difference ($t=2.54$; $p<0.05$) in the experience of male players (mean=3.4, SD=0.38) and female players (mean=3.07, SD=0.21) on the use of the 40mm ball. The means showed that the male players were more in favor of using the 40mm ball than the female players. Although the experience has moderately affected both, the effect on the performance of male players was greater than on female players. Thus, the null hypothesis that there is no significant difference between male and female in the use of the 40mm ball is rejected.

3.3 Experience according to competition level

Table 5. Statistical difference between male and female players on the experience of using the 40mm ball.

Variable	Subjects (n)	Mean	Standard Deviation	t
Male	21	3.4	0.38	2.54*
Female	10	3.07	0.21	

*p < 0.05

Table 6 shows the means for each category among the different competition levels.

Table 6. Mean for each category among the different competition level.

COMPETITION LEVEL	SERVICE	RECEIVE	OFFENSE	DEFENSE	INDIVIDUAL STYLES AND TECHNIQUE	TACTICS AND STRATEGIES	OTHERS
VARSITY	3.17	3.27	3.22	3.73	3.05	3.33	3.59
REGIONAL	2.99	3.34	3.49	3.33	2.85	3.08	3.22
INTERNATIONAL	3.18	3.35	3.21	3.34	3.08	3.13	3.25

Varsity level players, who are less skillful than the regional and international competitors, considered the 40mm ball most effective in defense since the ball is slower. The regional and international level players, however, experienced a big difference in terms of the speed of the ball in general. Due to the bigger diameter and weight of the 40mm ball, physiological factors were of significant

importance.

Table 7. Statistical difference between power and speed on the use of the 40mm ball.

Variable	Subjects (n)	Mean	Standa rd Dev iation	t
Speed	31	4.0	1.07	0.797*
Powe r	31	3.81	0.83	

$p < 0.05$

Table 8. Statistical difference between timing and agility on the use of the 40mm ball.

Variable	Subjects (n)	Mean	Standa rd Dev iation	t
Agility	31	3.35	0.88	1.194*
Timing	31	3.07	1.03	

$P < 0.05$

The results in Tables 7 and 8 shows that there are no significant differences between power and speed; and between timing and agility. This is due to the fact that speed and power are directly proportional to each other as well as timing and agility.

3.4 General evaluation and observations

The respondents were asked to comment on three questions concerning their overall evaluation and observation. Figure 1 shows the respondents answer to the question "Did it improve your game?"

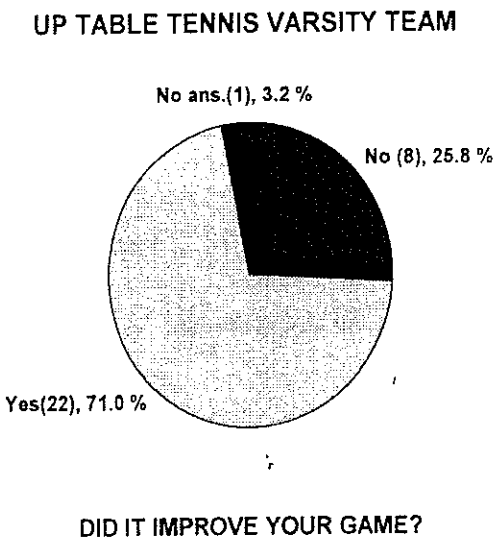

Figure 1. Did it improve your game?

Seventy-one percent (71%) of the respondents said that it did. This is due to the fact that the 40mm ball is easier to anticipate because the ball is slower. However, some of the respondents answered that it did not improve their game since they had to make more adjustments. Aside from slowing down the ball, some respondents replied that it is easier to block the ball, it produces better execution of strokes, it is easier to attack, it allows anticipation and control, and it even improves the timing of defensive players. On the other hand, there was the physiological consideration since the rallies are longer, the ball needs heavier brushing because of its weight and diameter.

Figure 2 shows the respondents' answer to the question "Do you prefer it over the 38mm ball?"

67.7% prefer the 40mm ball. Those who responded that they prefer the 40mm ball cited that it is slower and therefore enhances one's abilities. Some who responded positively also commented that it is better in execution of strokes, control, anticipation and recovery, the rallies are better, it is easier to use, and it is even better for the spectators since table tennis is a fast-paced sport. However, those who responded negatively commented that they had already got used to the 38mm ball. Others commented that it is more difficult to use the joints since the ball is slower, there are more errors especially with speed tactics, and it is difficult to attack especially against heavy spin.

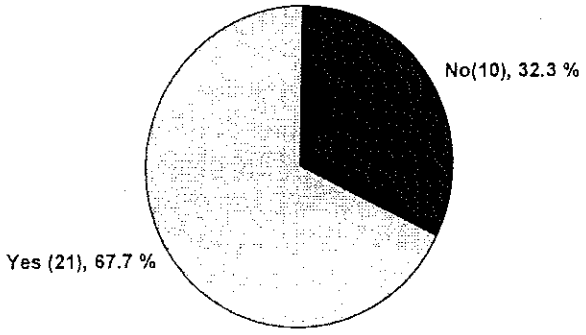

Figure 2. Do you prefer it over the 38mm ball?

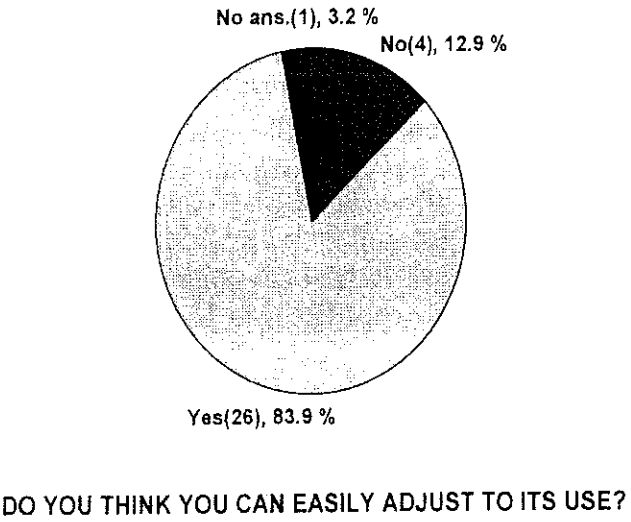

Figure 3. Do you think you can easily adjust to its use?

Figure 3 shows the respondent's answer to the question "Do you think you can easily adjust to its use?"

83.9% of the respondents said they could easily adjust to the use of the 40mm ball. To the respondents who answered that it improved their game (71%), the speed of the ball made much difference in attacking (mean=4.0) since the 40mm ball moves slower. This feeling is mainly because players can easily initiate an attack since the ball is also visible. Power was also a factor since the player should exert more power in executing an attacking stroke (mean=3.8). The same

is true with brushing the ball when executing an attack (mean=3.87). In effect physiological components, like improvement of player's fitness level, should b considered. It was also noted that the players moderately improved their playin styles (mean=3.0). In terms of service, the fast service is slightly more effectiv (mean=2.09) since it is easier to anticipate the ball. The Receive of service wa slightly more difficult against all categories. However, the flick was hardest wa to receive (mean=2.9) and gain a point. Initiating a second-ball attack wa slightly more difficult, with the long fast topspin service the least difficult. This i again due to the spin of the ball which is reduced compared to the 38mm ball With regards to defense, it was slightly more difficult to block (mean=2.51), pus against push (mean=2.22), push against a loopspin drive (mean=2.64), and lo (mean=2.5) with the push against push the least difficult.

The respondents moderately improved on the accuracy of their stroke (mean=3.16); the same is true with timing (mean=2.9). The respondents adjuste moderately wall to with the 40mm ball from the usual 38mm ball (mean=3.0) The respondents find it easier to attack after service against a long receiv (mean=2.48). This is due to the fact that the player can easily view a knuckle bal since it is bigger.

In general the 40mm ball is acceptable and the players are willing to trai harder in order to perform better with the new ball.

4 Summary of results, conclusions and recommendations

4.1 Summary of results

The purpose of this study was to investigate the experiences of loca competitive table tennis players during the first official local tournament usin the 40mm ball. Specifically, it identified their experiences and the significan differences according to gender, competition level and playing styles. Further, th experience in the different aspects of service, receive, offense, defense, individua styles and techniques, tactics and strategies and others (power, agility, speed an timing) were surveyed with the significant differences between male and femal players analyzed. General evaluation and observations from the respondents were also gathered to provide information on their perceptions.

Thirty-one subjects (male=21; female=10) with age range 17-24 years old were respondents to a 5—point Likert Scale researcher-developed questionnaire. This called for the player to make a response regarding his/her perception on th use of the 40mm ball in an actual match. The descriptive method of research wa applied in this study to show the differences among gender, competition level and playing styles.

The results generated from the study are as follows:

1. All participants on the average answered 'moderately' (mean=3.29) in favo of the 40mm ball.

2. Male participants scored higher (mean=3.4) in their overall responses than female participants (mean=3.07).

3. There is a significant difference between the male and female players in their general experience and perception in using the 40mm ball.

4. Among the different competition levels, the varsity level participants favored the 40mm ball most (mean=3.32).

5. Offensive players favored the 40mm ball more (mean=3.38) than the defensive and allround players.

6. Seventy-one percent of the subjects responded positively to the 40mm ball as having improved their game.

7. Sixty-eight percent of the subjects prefer the 40mm ball over the 38mm ball as a factor in enhancing one's performance.

8. Eighty-four think that they can easily adjust to the use of the 40mm ball.

4.2 Conclusions

The results of the study led the researcher to draw the following conclusions:

1. The following null hypotheses were rejected:
   a. There is no significant difference between male and female players in terms of their general experience in the use of the 40mm ball.
2. The following null hypotheses were accepted:
   a. There is no significant difference among power and speed as well as timing and agility in the use of the 40mm ball

3. University of the Philippines varsity table tennis players have accepted the use of the 40mm table tennis ball. Although their initial experience has somewhat affected their skill because they will have to make some adjustments to improve their playing styles, in the long run it will be more beneficial for them not only in local tournaments but in international competitions as well. With the slower speed of the ball our local players can cope better with the demands in the international scene. This has been a problem for our local players because the 38mm ball was too fast especially when they play against top foreign players. The ability to anticipate the ball will be better and the players will be able to recover faster. Also, older players can keep up with the pace whereas the 38mm ball was more to the advantage of younger players. Further, it is foreseen that female players will be able to catch up with the level of performance of their male counterparts.

4. Since the 40mm ball is more visible, anticipation by the player will

improve. It will also be more attractive to the spectators and this will popularize the sport more. And promoting it would mean more market for exposure especially in the media. At present, regular viewing of table tennis has been evident in cable television simply because the sport is starting to be more attractive since the new provision on the 40mm ball took effect.

5. In the use of the 40mm ball much attention will be given to the physiological considerations of training in the sport.

6. Finally, researches and new trends will improve the sport in terms of its physical, biomechanical as well as psychological aspects (e.g., development of a 45mm ball; higher height of the net).

4.3 Recommendations

The following recommendations are hereby forwarded. First, since the ball is still relatively new to our local table tennis players, more training methods should be improved in order to enhance performance. Coaches should design programs

in relation to the use of the 40mm table tennis ball especially in the physiological aspect. More weight training as well as cardiovascular programs should be implemented. Since there is a need to brush the ball more when initiating a spin, more arm strength is required especially in the wrist. The longer rallies and the bigger and heavier ball require more physical exertion during the execution. Technical training should also be improved in terms of administering the right drills for a particular technique. Multiple ball training is highly recommended so as to improve not only the player's technique but also his/her aerobic and anaerobic capabilities.

Second, more promotion and marketing on the sale and use of the 40mm ball should be done especially in the different regions. This is where we can tap more potential players, which at present is focused only in the metropolis. There should also be aggressive information dissemination on this new rule since in the provinces the use of the 38mm ball is still in effect.

Third, more regular tournaments with the 40mm ball should also be organized nationwide. The national sports association, clubs and other athletic associations should take initial steps in order to come up with a comprehensive program from the grass roots to the elite level. This in effect will improve the level of play in our local table tennis scene.

Lastly, since the study has somewhat provided valuable information on the use of the 40mm table tennis ball, it is highly recommended that table tennis enthusiasts should also come up with other significant ideas or researches to improve the standard of table tennis in the Philippines.

5 Author note / Acknowledgement

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I would first like to thank the Good Lord Thy Savior for giving me the courage to pursue this study for the love of the sport that I am deeply committed to. Special appreciation is likewise to be granted to the participants of the 1st U.P. 40mm Ball Table Tennis Championships for taking their time off to help me accomplish this task.

I also dedicate this study to my fellow coaches who in one way or another can use this study to further enhance the sport of table tennis with the presence of current trends especially the sciences involved with it. This will further improve the quality of coaching and training of the athletes for performance enhancement.

For further inquiries or for copies of this study you may write to or call:

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