Analysis of Influencing Factors of Knowledge Sharing in the Virtual Academic Community: Based on the Motivation and Demand Theory

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Abstract

Virtual academic community is an important position for academic exchange activities of contemporary academic users, while knowledge sharing and communication are the key to its survival and development, as well as its core value. Based on the influence of the characteristics of the virtual academic community on the content of knowledge sharing, the paper integrated the motivation and demand theory, and established the influencing factor model of knowledge sharing in the virtual academic community. The results show that pleasure in helping people, trust and social connections have the significant positive influence on knowledge sharing behavior, Trust and social connections have the significant positive influence on knowledge sharing quality of members in virtual academic community, and reputation and reciprocity have little influence on knowledge sharing quality.

Key words: Virtual academic community; Motivation theory; Demand theory; Influencing factors; Knowledge Sharing

INTRODUCTION

Academic communication is an indispensable part of scientific research activities of researchers, and the necessary condition for promoting academic prosperity and technological innovation. The traditional forms of academic communication are usually restricted by time, place and space of the participants, which imperceptibly limit the speed of knowledge sharing and the breadth of communication. With the rapid development of Internet technology and the change of information exchange method, the virtual community platform came into being, which has gradually become the important place for knowledge exchange and sharing due to its high openness and interaction. More and more researchers have also started to share knowledge through virtual platforms, and a number of virtual academic communities, headed by Home of Management, Small Wood Worm, Ding Xiang Garden, and Science Net, have been favored by many researchers. In the virtual academic community, the members can not be restricted by time and space, and can transfer and exchange information freely. It occupies a very important position in people's daily life, learning and work (Scribne, 1999; Weigand, Moor, & Heuvel, 2000).

Although there are many advantages in the breadth of knowledge exchange interface and the quantity of information acquisition in the virtual academic community, compared with the traditional academic communication form, the particularity of virtual academic community will have a certain influence on users' knowledge sharing behavior and content. High quality content often requires effective participation of community users, but through confirmation by practical research and related literature, a large number of users in the virtual academic community do not share their knowledge with others, and are more likely to be in a "dive" state, and some active users who have been keen to contribute knowledge will no

longer participate in knowledge sharing as time goes on, which results in the more and more serious phenomena such as virtual community users' lack of participation and lower knowledge contribution intention (Van Raaij & Schepers, 2008). Therefore, it is crucial to study and grasp the factors influencing users' willingness of knowledge contribution, so as to explain and improve the current status of low knowledge contribution rate of users in virtual academic communities, which is also the key content to ensure the sustainable development of virtual academic communities. In many studies, the two aspects of motivation and demand are seldom considered at the same time to research knowledge sharing. There is a transitional stage between motivation and demand, it can be said that demand does not necessarily lead to motivation, but there is the demand for motivation, and demand and motivation affect and decide users' behavior together (Maslow, 1943). Therefore, this paper takes motivation and demand as the research perspective, including all motivations and the needs unconverted to motivations, explores the influencing factors of users' knowledge sharing behavior and quality in the virtual academic community, and finally, the conclusions are put forward to offer the corresponding management suggestions.

1. LITERATURE REVIEW AND COMBING

1.1 The Connotation and Characteristics of Virtual Academic Community

1.1.1 The Connotation of Virtual Academic Community

In terms of the connotation definition of virtual academic community, Wang (2010) thinks that virtual academic community must have the general character of communities, that is to say, computers need to be used as the medium for user communication, and it also have the particularity with the target of academic knowledge communication (Ibid.). In the study of Ye (2011), he believes that the purpose of building a virtual academic community is to serve scientific research, participants can discuss related expertise in a particular field, and the community's user groups are aimed at professionals rather than ordinary users; Xu Meifeng and others believe that the virtual academic community is a professional community that carries out academic information exchange activities based on specific professional themes, and define the category of virtual academic community from three aspects, (a) to serve academic research as the purpose, (b) research in the specific field as the exchange content, and (c) a stable professional user group. Liu and others believe that virtual academic community is a virtual learning community aiming at exchanging academic views, experiences, documents, reviews and feedbacks by users (Liu & Shao, 2013). At present, the

definition of virtual academic community has not been widely recognized, but the connotation has emphasized its academic nature, mainly embodied in the academic, professional and other characteristics in the aspects of community users, and their communication content, communication purpose, community atmosphere and others.

1.1.2 The Characteristics of Virtual Academic Community

Virtual academic community is an integral part of virtual community, which has universality and particularity. Based on the research of scholars, it concludes that the virtual academic community is mainly characterized by the following characteristics (Chen, 2007; Scribner, 1999): (a) The combination of authenticity and anonymity of membership. (b) Expansion of knowledge exchange scope: In the form of computer mediated communication, users interested in various professional fields can be gathered in the same network space, and any user can provide or obtain services at any time, anywhere, and expand the scope of knowledge sharing. (c) Equality: community members communicate in the community without being restricted by identity, status and position. (d) Professionalism: the discussed content is professional, and the professionalism is also reflected in the attribution of registered users to specific specialties or disciplines, for example, in Science Net, the community is divided into different professional sections, such as medicine and life, according to the type of needs of the participants. (e) Freedom: virtual academic community advocates freedom of introduction and creates a free academic atmosphere. (f) Feedback in time: users in the virtual academic community are not restricted by time and space, so as to publish or share knowledge at any time and place, and get timely feedback.

1.2 Self-Determination Theory

The theory of self determination is a theory of motivational process on human self determination in 1980s by American psychologists Deci Edward L and Ryan Richard M et al. which is mainly divided into 3 types: intrinsic, extrinsic and non motivational (Deci & Ryan, 2008). Intrinsic motivation is a kind of driving force that human beings have when they are born without external influence. Extrinsic motivation represents people's tendency to engage in an activity to get some detachable results, not from interest in activities. No motivation means users have no interest in activities, with no idea. The self-determination theory holds that the controlled motive, that is, the individual's behavior is caused by external pressure; the autonomous motive, that is, the individual's behavior comes from personal desire. In certain contexts, controlled and autonomous motives can coexist and transform, but self-active opportunities result in more positive behavioral

outcomes, especially for unpaid and motivated conditions and prosocial behavior (Gagne & Deci, 2005). The Studie also shows that autonomous motivation has a significantly positive affect in individuals' knowledge sharing (Gagne, 2009).

1.3 Hierarchy of Needs Theory

In 1943, American psychologist Abraham Maslow put forward a new theory in the theory of human motivation: hierarchy of needs theory. In the book, human needs are divided into 5 levels from low to high based on the ladder: physiological needs, security needs, social needs, esteem needs and self fulfillment needs (Maslow, 1943). From the minimum needs to the higher level needs, the proposed theory is in line with the general development rule of people's needs to some extent. In the field of knowledge management, the hierarchy of needs theory is often mentioned. In the study of tacit knowledge sharing in the library, Yang Hailing found that establishing the incentive mechanism in line with the level of individual needs, can more effectively stimulate the sharing of tacit knowledge, which is also mentioned by Xu Shixin in

"Discussion on library knowledge sharing". In the study of the incentive mechanism of user participation in the construction of digital collections, Huo Jian Mei and Li Shuning found that compared with material incentives, the list can stimulate the internal needs of users to pursue self, and people will constantly want to be recognized and appreciated by others.

2. THEORETICAL MODEL AND HYPOTHESIS

Based on the theory of self determination and social needs in Maslow's hierarchy of needs theory, this paper constructed a research model (as shown in Figure 1), to explore the impact of internal motivation (self value and pleasure in helping people), external motivation (reputation, reciprocity and perceived benefit) and social needs (trust and social connections) on knowledge sharing behavior and quality of the virtual academic community platform. The theoretical model is as shown in the following Figure 1:
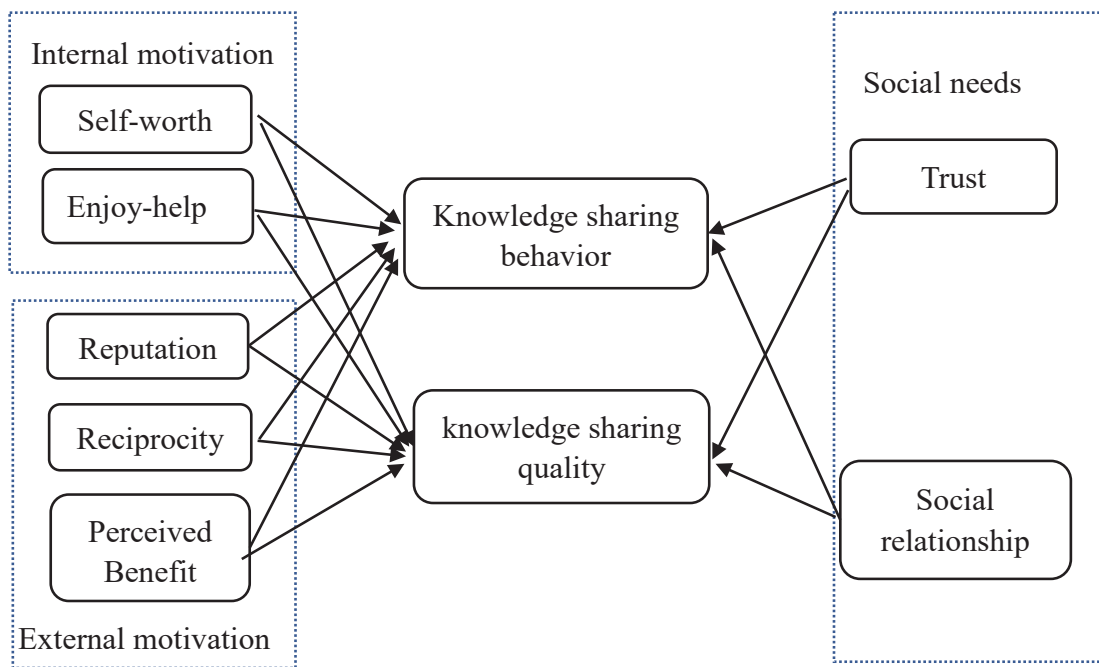

Figure 1
Theoretical Model

Motivation is the direct cause of behavior, which can be divided into intrinsic motivation and extrinsic motivation. Intrinsic motivation is an inherent ability of human beings to pursue novelty and challenge, develop and exercise themselves, and also a natural tendency to explore and learn, which is highly autonomous and represents the prototype of self determination. And extrinsic motivation does noy refer to people's interest in activity itself, but it is a tendency to engage in an activity

to get some detachable result (Deciel & Ryanrm, 2008).

Self-worth is a very critical motivation that users believe in their knowledge, a expects to contribute to the platform (Drake & Moberg, 1986). Perceived self-worth has a positive impact on users' knowledge sharing behavior. Human value is a special form of value relations, which are mainly based on self value as the main body, and the value of society and others as the object. But everyone has material and spiritual needs, and

when people meet the needs of survival, they hope that they can be affirmed by others, and the knowledge and content they have learned can help others to realize their self value. Therefore, this paper assumes that:

H1a: The realization of self-worth is positively correlated to users' knowledge sharing behavior.

H1b: The realization of self-worth is positively correlated to users' knowledge sharing quality.

The concept of "altruism" is the structural source of "pleasure in helping people", as users can get the affirmation of recipients and their satisfaction and pleasure, by asking questions, answering questions, and helping others. Altruism pays knowledge of helping others, and gains improvement of self value (Chiu & Hsu, 2006). Therefore, for the reasons above, this paper assumes that:

H2a: There is a positive paper between pleasure in helping people and knowledge sharing behavior of participants.

H2b: There is a positive correlation between pleasure in helping people and knowledge sharing quality of participants.

Extrinsic motivation emphasizes the driving effect of external stimulus and situations on behaviors. Researchers believe that any behavior is to get reinforcement and rewards to satisfy individual's inner needs. Extrinsic motivation is divided into four aspects of reciprocity, reputation, perceived benefit and perceived convenience (Shah, Kitzie, & Choie, 2014).

Reciprocity means that the current knowledge sharing behavior will meet the future demand for knowledge. Usually, when time, energy and knowledge are limited, people always expect their behavior to be rewarded, and when users contribute knowledge, they can receive future rewards and expectations from recipients. Some studies believe that the group that contributes knowledge in virtual community believes in reciprocity, and the interaction between knowledge sharing and reception will happen in the future (Lin & Hung, 2009). Reciprocity is the fairness of people about knowledge sharing behavior, and if they expect a fair and rewarding return, they will be more actively involved in knowledge sharing. Therefore, this paper assumes that:

H3a: Reciprocity is positively correlated to users' knowledge sharing behavior.

H3b: Reciprocity is positively correlated to users' knowledge sharing quality.

Reputation is a series of rewards different from money, which can help members to get and maintain a certain position in the community, and they want other members to think they are valuable and knowledgeable people (Prescott & Heber, 2010). Previous studies have shown that reputation building is a powerful driving force for knowledge sharing, and can help people generate positive knowledge sharing attitude. The

participation degree of members will increase with the increase of reputation. And previous studies have provided evidence for reputation to enhance community members' knowledge sharing behavior. Therefore, this paper assumes that:

H4a: Reputation is positively correlated to users' knowledge sharing behavior.

H4b: Reputation is positively correlated to users' knowledge sharing quality.

Knowledge is an important resource in the era of knowledge economy. And for the members of virtual academic community, knowledge owned by individuals is their important wealth. In addition, knowledge sharing also requires a certain amount of time and money costs, and community members of knowledge sharing will expect a certain reward to make up for this cost, to bring about a certain benefit to their knowledge. Previous studies have confirmed that driving by benign interest can better enable community members to contribute their knowledge. Therefore, this paper assumes that:

H5a: Perceived benefit is positively correlated to users' knowledge sharing behavior.

H5b: Perceived benefit is positively correlated to users' knowledge sharing quality.

In Maslow's hierarchy of needs theory, social needs are higher than those of physiological needs and security needs. Everyone is not an individual, instead, they live together as a group and have their own social circles, which are the same in the social Q&A platform. So in this virtual social circle, every user has his own social needs.

Trust is the most basic item of social needs, and users' willingness based on taking risks (Shah & Kitzie, 2014). Only when people trust each other, can users share their tacit knowledge voluntarily. Users believe that they have the ability to solve problems, which is the fundamental reason why users ask questions in social Q&A platform. Besides, social Q&A platform needs not answers, but reliable and effective answers with a certain degree of trust. Therefore, this paper assumes that:

H6a: trust is positively correlated to the quantity of users' knowledge sharing.

H6b: trust is positively correlated to user's knowledge sharing quality.

Social connections refers to the general relationship among people in the common material and spiritual activities, which is very complex in the real world, and the resource of production in social capital theory (Maslow, 1943), while it still exists in the virtual academic community platform. By sharing knowledge and the wisdom of integrating into a group, the users find their own knowledge group and form a group. In this way, the users can find like-minded teammates and improve the contributor's overall contribution level from the other side. So the paper assumes that:

H7a: Social connections is positively correlated to the quantity of users' knowledge sharing.

H7b: Social connections is positively correlated to users' knowledge sharing quality.

3. DATA ANALYSIS AND MODEL TEST

The paper takes college teachers and students who often use the virtual academic community and online registered users of the community as the investigation objects, and virtual academic community mainly refers to these communities with the purpose of academic activities, such as Home of Management, Small Wood Worm, Ding Xiang Garden, Science Net and so on. Referring to the mature scale and item in the existing literatures at home and abroad, a measurement scale suitable for this paper is put forward, as shown in table 1, and all of the items are from the mature scale, which use the Likert five-point Scale, while 5 means "very agree", 3 means "general" and 1 means "totally disagree". The questionnaires were made on the Wenjuanxing Website, and sent to the relevant academic social groups and postgraduate scientific research project groups through QQ group, WeChat and other social media, while the questionnaire links were also sent to the community website.

Table 1
The Measurement Scale of This Paper

Potential variable	Number	Item content	Reference
Self value	SW1	Sharing knowledge makes me feel a sense of achievement	Drake, B. H., & Moberg, D. J., 1986
	SW2	Sharing knowledge makes me feel that I am needed by others	
	SW3	Sharing knowledge makes me feel better than some people.	
Pleasure in helping people	EH1	I like to the sense of sharing knowledge in the community	Chiu, C. M., & Hsu, E., 2006
	EH2	I feel very happy that I can share knowledge and help others in the community.	
	EH3	I enjoy myself in the process of sharing knowledge.	
Reciprocity	REC1	When I share knowledge in the community, there are others besides me who can share knowledge.	Lin, M. J., & Hung, S. W., 2009
	REC2	When I share knowledge in the community, I think I can find the information I need in the community when I need it.	
	REC3	When I share knowledge in the community, I think I will also get the respond to my requests for information.	
Reputation	REP1	I get the respect from community members by sharing knowledge.	Prescott, C., & Louis H., 2010
	REP2	By sharing knowledge, I can improve my rank and feel my status improved.	
	REP3	Sharing knowledge improves my reputation in the community, and more members will know me.	
Perceived benefit	PB1	Sharing knowledge can give me the opportunity to enjoy the privilege or free experience of the community.	Chiu, C. M., & Hsu, E., 2006
	PB1	Sharing knowledge makes me get more virtual money	
Trust	TR1	I have confidence in the members of the community, that they will also share knowledge.	Chen, Y. L., 2007
	TR2	I firmly believe that the answers provided by other users are accurate and valuable.	
	TR3	I believe that the community platform is privacy, which can protect the intellectual property rights.	
Social connections	SR1	By sharing my knowledge, it is convenient for me to make friends with other members.	Zhao, L., et al., 2012
	SR2	Sharing my knowledge will strengthen my connection with other members.	
	SR3	Sharing knowledge helps me better cooperate with excellent members and find like-minded teams.	
Knowledge sharing behavior	KSB1	I answered the question in the academic community	
	KSB2	I volunteered to share my knowledge and experience in the academic community	
Knowledge sharing quality	QL1	The knowledge I share is timely and correct	
	QL2	The knowledge I share can solve the problem	
	QL3	The knowledge I share is complete and innovative.	

Data source: Collation and induction of literature.

3.1 Descriptive Data Analysis

The collection date of the questionnaire was from January 10, 2018 to March 20, 2018, with a total of 288 collected questionnaires, including 40 questionnaires from non-members of the virtual academic community and 248 from the registered members of the virtual academic community, of which, 240 questionnaires are valid, with the effective recovery rate of 83.33%.

The sex composition of the samples is more uniform, while the proportions of men and women are respectively 53.33% and 46.67%; the age of them is mainly in the range of 18-25 and 26-35, accounting for 95.5% of the total, which is basically the same as the age level of the main user groups in the virtual academic community. The educational background of the samples is mainly concentrated in the stage of higher education, with the largest number of undergraduates and postgraduates.

Table 2
Descriptive Statistics of Samples

Statistical factor	Classification	Quantity	Proportion	Statistical factor	Classification	Quantity	Proportion
	Under 18	1	0.4%		Under junior college	2	0.8%
	18-25	148	61.7%		Junior college	13	5.4%
Age	26-35	81	33.8%	Educational level	Undergraduate	165	68.8%
	36-45	8	3.3%		Master	45	18.8%
	45以上	2	0.8%		Doctor and above	17	7.1%
Statistical factor	**Classification**	**Quantity**	**Proportion**	**Statistical factor**	**Classification**	**Quantity**	**Proportion**
	every day	55	22.9%		Less than 1 year	29	12.1%
	3-5 times a week	86	35.8%		1-2 years	51	21.3%
Use frequency	1-2 times a week	50	20.8%	utility time	2-3 years	68	28.3%
	Less than 1 times a week	49	20.4%		More than 3 years	92	38.3%

Data source: Collation according to the questionnaire.

In terms of factors, the scores of social connections and self value are higher, which are 4.1 points and 4.86 points respectively. It can be seen that members of the virtual academic community pay more attention to the realization of self value and the high-level spiritual needs of social connections.

3.2 Reliability and Validity Test

Cronbach's α coefficient is the most widely used indicator of reliability, of which the value closer to 1 means the higher reliability of the factor. The total Cronbach's α value of the questionnaire is 0.870, and the Cronbach's α value of each factor is between 0.713 and 0.965, which is in line with the requirement that the Cronbach's *α* value of total and each factor are greater than 0.7. In this paper, SPSS 20.0 is used to analyze the sample data, and the data is summarized as shown in the table.

The validity of the questionnaire is analyzed by Kaiser-Meyer-OIkin (KMO) and Bartlett's sphericity. According to the experience and related literature, the larger KMO value is more suitable for data analysis, and the overall KMO value of this questionnaire is 0.855, while the contribution of cumulative variance of the eigenvalue greater than 1 is between 65% and 86%, which is higher than the standard of 55%, and suitable for the next factor analysis.

Table 3
Cronbach's a Value of Each Factor

Factor	α value
Self value	0.848
Pleasure in helping people	0.746
Reciprocity	0.713
Reputation	0.771
Perceived benefit	0.798
Trust	0.819
Social connections	0.965
Knowledge sharing behavior	0.894
Knowledge sharing quality	0.784

Table 4
Test Results of Factor Validity

Factor		KMO		Bartlett sig.
Integral		0.855		0.000
Self value	0.892			0.000
Pleasure in helping people	0.733	0.889		0.000
Reputation	0.820			0.000
Reciprocity	0.834	0.814		0.000
Perceived benefit	0.785			0.000
Trust	0.812			0.000
Social connections	0.868	0.825		0.000
Knowledge sharing behavior		0.797		0.000
Knowledge sharing quality		0.753		0.000

Data source: Summary of SPSS calculation results.

By comparing the square root of AVE value of each factor and the correlation coefficient among factors, the paper investigated the discriminant validity. As shown in Table 3, the square root of AVE value of each factor is obviously larger than the correlation coefficient between the factor and other factors, which shows that the factor has good discriminant validity, each variable has its independence, and the structure of the measurement model is set up reasonably, while each variable is relatively independent.

Table 5
The Correlation of Variables

Factor	SW	EH	REP	REC	PB	TR	SR	KSB	QL
SW	0.892								
EH	0.575	0.813							
REP	0.210	0.141	0.844						
REC	0.421	0.538	0.274	0.878					
PB	0.353	0.305	0.203	0.143	0.754				
TR	0.548	0.511	0.262	0.578	0.432	0.798			
SR	0.467	0.488	0.203	0.495	0.198	0.584	0.905		
KSB	0.509	0.529	0.331	0.473	0.395	0.582	0.404	0.946	
QL	0.495	0.485	0.225	0.435	0.289	0.560	0.538	0.587	0.813

3.3 Test of Structural Equation Model

In this paper, Smart PLS software is used to analyze the structural model. PLS (partial least squares) is a partial least square method, which not only has a strong ability to explore and verify the theory, but also can better deal with the complex model, and has been widely used in various fields. The analysis results of the paper are shown in the following table.

It is clear that only 5 variables are significant. Through hierarchical regression methods (first use fewer independent variables and then gradually put the other independent variables into models), after several trials, the reason of the insignificant phenomenon is the weakening effect. This paper adds 7 self-worth, enjoy

Table 6
Path Coefficient Test

	Hypothesis	β value	T value	Test results
H1a	SW→KSB	0.133	1.69	Not significant
H1b	SW→QL	0.138	1.536	Not significant
H2a	EH→KSB	0.208***	2.689	Significant
H2b	EH→QL	0.15	1.657	Not significant
H3a	REP→KSB	0.056	0.94	Not significant
H3b	REP→KSB	0.084	1.27	Not significant
H4a	REC→KSB	0.15	1.567	Not significant
H4b	REC→QL	0.063	0.86	Not significant
H5a	PB→KSB	0.071	1.37	Not significant
H5b	PB→QL	0.06	0.51	Not significant
H6a	TR→KSB	0.219***	2.674	Significant
H6b	TR→QL	0.302***	3.18	Significant
H7a	SR→KSB	0.215***	2.439	Significant
H7b	SR→QL	0.228***	3.07	Significant

help, reputation, reciprocity, perceived benefits, trust, and social relationships in order, every time the model increases the variable, the explanatory power of the model also increases, which indicates that every variable plays a non-negligible role on the behavior of knowledge sharing and the quality of knowledge sharing.

Table 7
The Explanatory Power of the Models

R^2	REP	↘REC	↘PB	↘EH	↘SW	↘TR	↘SR
KSB	0.065	0.283	0.333	0.362	0.401	0.428	0.456
QL	0.142	0.221	0.261	0.337	0.414	0.443	0.495

This paper mainly studies the influencing factors of the knowledge sharing behavior in the academic virtual community platform, and also analyzes the influencing factors of the knowledge sharing quality. After analyzing the collected data, get some meaningful discoveries. First of all, trust is an important factor of user knowledge sharing in virtual academic community. Trust has the most significant impact on knowledge sharing behavior (β=0.219, P<0.05) and the number of knowledge sharing (β=0.303, P<0.05). This is consistent with the results of Chiuet al and Wu Jilan. In the network virtual era, if people's trust between the network is obviously lacking, it may bring some bad effects, such as network rumors, network fraud, so trust is very important in the virtual academic community platform. Secondly, the intrinsic motivation to help others in the sense of pleasure (β=0.250, P<0.05) is a significant positive correlation with knowledge sharing behaviors, helping people to enjoy is always the traditional virtue of the Chinese nation, it has been advocated for thousands of years so academic

virtual community members are more likely to help others through the sharing of knowledge and satisfaction of happiness. Social relationships have significant positive correlation to knowledge sharing behavior (β=0.215, P<0.05) and knowledge sharing quality (β=0.228, P<0.05). It can be seen that in the virtual academic platform, the intrinsic motivation and demand is the driving force to promote the knowledge sharing behavior of users. The managers of virtual academic community should pay more attention to the needs and preferences of users when maintaining the platform, which will become a good measure for the sustainable development of the platform. Managers should pay more attention to the credibility and recognition of the platform in the management and maintenance, and build a good bridge for the communication of community members' knowledge.

In summary, if the virtual academic platform wants to gain wider popularity in the future virtual environment, in addition to motivating accidents through common external motivations such as bonus points, grade upgrading, and

so on, considering the more needs of users, it is more important to take on the role of communication bridge between the members of the community, to ensure the formation of a "unobstructed" speaking mechanism within the community, and to form a good atmosphere of trust. Under the mutual promotion of certain extrinsic motivation and intrinsic motivation, individual user behavior can also be guided to meet their individual needs, so as to ensure that the users in the social Q & A platform contribute more high-quality knowledge.

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