

Construction and Validation of Attitudes Toward Plagiarism Questionnaire

Mavrinac, Martina; Brumini, Gordana; Bilić-Zulle, Lidija; Petrovečki, Mladen

Source / Izvornik: **Croatian Medical Journal, 2010, 51, 195 - 201**

Journal article, Published version

Rad u časopisu, Objavljena verzija rada (izdavačev PDF)

<https://doi.org/10.3325/cmj.2010.51.195>

Permanent link / Trajna poveznica: <https://urn.nsk.hr/urn:nbn:hr:184:686314>

Rights / Prava: [Attribution 4.0 International](#)/[Imenovanje 4.0 međunarodna](#)

Download date / Datum preuzimanja: **2025-01-15**



Repository / Repozitorij:

[Repository of the University of Rijeka, Faculty of Medicine - FMRI Repository](#)



doi: 10.3325/cmj.2010.51.195

Construction and Validation of Attitudes Toward Plagiarism Questionnaire

Martina Mavrinac, Gordana Brumini, Lidija Bilić-Zulle, Mladen Petrovečki

Rijeka University School of Medicine

Aim To develop and test the psychometric characteristics of a questionnaire measuring attitudes toward plagiarism.

Methods Participants were 227 undergraduates and graduate students (128 women and 99 men) from three Croatian universities, with a median age of 21 years (range 18 to 48). Research was conducted from March to June 2009. For the purpose of construction of the first version of the questionnaire, 67 statements (items) were developed. The statements were based on the relevant literature and were developed following rules and recommendations for questionnaire writing, and 36 items were chosen for final validation. Factor analysis was used to find out the factor structure of the questionnaire and to measure construct validity.

Results The final version of the questionnaire consisted of 29 items divided into a three-factor structure: factor I – positive attitude toward plagiarism (12 items); factor II – negative attitude toward plagiarism (7 items); and factor III – subjective norms toward plagiarism (10 items). Cronbach α was calculated to confirm the reliability of the scale: factor I – $\alpha=0.83$; factor II – $\alpha=0.79$; and factor III – $\alpha=0.85$. Correlations between factors were: -0.37 between I and II, -0.41 between I and III, and +0.31 between II and III.

Conclusion Attitudes Toward Plagiarism questionnaire was developed, with good psychometric characteristics. It will be used in future research as a standardized tool for measuring attitudes toward plagiarism.

Received: March 5 2010

Accepted: May 28, 2010

Correspondence to:

Martina Mavrinac
Department of Medical Informatics
Rijeka University School of
Medicine
B. Branchetta St. 20
51 000 Rijeka, Croatia
umartina@medri.hr

In recent years, scientific misconduct and academic dishonesty have been in the focus of interest of the academic and scientific community (1-5). Academic misconduct is defined as any type of cheating that compromises the educational process and academic integrity of the institution. It includes plagiarism, fabrication, deception, corruption, and sabotage, while scientific misconduct usually includes fabrication, falsification, plagiarism, and other unethical behavior in professional scientific research (6-8). Plagiarism is the most frequent type of misconduct (9,10) and is defined as "unauthorized appropriation of another's work, ideas, methods, results or words without acknowledging the source and original author" (4). Self-plagiarism is widely considered to be a type of plagiarism, and it is defined as the inappropriate presentation of one's own published data or text as new and original. Among all types of misconduct in science and in an academic environment, plagiarism is considered to be the most vicious between peers, because it constitutes theft of intellectual property, which is the core achievement of intellectual work.

The implementation of computer technology and the availability of scientific papers and books in electronic form have facilitated plagiarizing by allowing simple "copy-and-paste" procedures (11). On the other hand, the same technology has also enabled the development of plagiarism detection software (12,13).

The extent of academic plagiarism has been studied extensively (3-5,13). Rennie (3) reported that 56% of medical students in the US plagiarized at least once in their academic career. Elzubeir (5) found that 27% of medical students in their fifth and sixth academic years and medical interns from the United Arab Emirates considered plagiarism an appropriate behavior. Results from one Croatian study (4) were even more alarming: 90% of medical students plagiarized to some extent on their essay-based assignments.

Estimates of the prevalence of plagiarism in the scientific community are not yet known. However, Martinson et al (14) reported that 2% of authors used another's ideas without obtaining permission or giving credit to authors. Unfortunately, recent findings have suggested that most cases of research misconduct remain undetected (9,15). The motivation to plagiarize is affected by various factors such as English as a second language (15,16), material and social benefits (17), and a lack of respect for intellectual property in certain cultures (18,19). Besides motivation, another important factor that may explain plagiarism is authors' tolerant attitudes toward this form of misconduct; therefore, develop-

ment of successful policy for preventing and reducing plagiarism needs to take authors' attitudes into account.

Questionnaires are a standard tool for measuring attitudes (20,21), and numerous studies have used different questionnaires to evaluate attitudes toward plagiarism (3,5,22). However, there is still no standardized, validated questionnaire available. Research results obtained using validated questionnaires are more relevant and reliable than those obtained from unvalidated instruments. The former are, therefore, more suitable for developing guidelines for educational programs to raise the quality of academic and scientific work. The aim of this study was to develop and test psychometric characteristics of a questionnaire designed to measure attitudes toward plagiarism for future use in research on plagiarism in the scientific and academic communities.

METHODS

Approval for this study was obtained from the University of Rijeka, School of Medicine Ethics Committee and accepted by the Croatian Ministry of Science, Education, and Sports. Participants also gave oral consent to participate in the study.

Questionnaire development

In questionnaire development, Ajzen's theory of planned behavior (TPB) was chosen as a model to predict the intention to plagiarize. TPB is a relevant predictive model of academic dishonesty that explains behavior as a final act anticipated by logical thinking (23,24).

The relevant scientific literature studying plagiarism was reviewed to locate questionnaires measuring attitudes toward plagiarism. Harris (22) developed a simple questionnaire titled "Plagiarism Attitude Scale" consisting of 12 statements. The scale was designed for high school and undergraduate students, is quite short, and there are no data on validation. Other questionnaires were also designed for students or for measuring cheating and misconduct in general. Therefore, they cannot easily be used for broader studies of scientific and academic communities, so we decided to create new statements for our questionnaire. We adapted 5 statements from Harris' scale and created 62 new ones by considering the most important issues in plagiarism and also self-plagiarism. All 67 statements were written in Croatian and were adjusted to conform with the rules and recommendations for questionnaire writing (25). Three

experts in questionnaire construction and validation independently reviewed the 67 statements and removed those with similar or equivalent meaning, and those that were unclear or ambiguous. This left 36 statements that were found to be appropriate and were chosen for the first version of the Attitudes Toward Plagiarism (ATP) questionnaire.

Answers to all statements were offered on a five-point Likert-type scale (21), where 1 indicated "strongly disagree;" 2 – "disagree;" 3 – "neither agree nor disagree;" 4 – "agree;" and 5 – "strongly agree." The order of statements in the questionnaire was randomized. The first part of the ATP questionnaire consisted of 2 questions on demographic data.

Participants

For validation, the questionnaire was administered to a sample of 227 undergraduate and graduate university students (128 women and 99 men). Their median age was 21 years (range, 18 to 48). Participants were 121 medical students, 51 engineering students, and 55 psychology students. The research was conducted from March to June 2009 at 3 Croatian universities: the School of Medicine and School of Engineering at Rijeka University, the School of Medicine at Split University, and the School of Philosophy at the Osijek J. J. Strossmayer University.

Procedure

The questionnaire was administered by 3 different course instructors familiar with the research. All participants were given the same instructions for answering the questionnaire, printed on paper. The instructions explained our research, identified the main researchers, and briefly defined plagiarism and self-plagiarism. The instructions also directed participants to honestly fill out the questionnaire. The questionnaire, preceded by the instructions, was administered in classroom settings during regular classes. The participants independently completed the questionnaire, which took approximately 10 minutes. Participation was voluntary and completely anonymous, and the completion rate was 99%. The questionnaire was given to 229 participants, but 2 of them did not fulfill the entire questionnaire and were excluded from research.

Questionnaire validation

Principal component analysis (PCA) was used to validate the questionnaire. The number of factors to retain was determined by the Scree-test and interpretability criteria. A

three-factor structure was disclosed, addressing different aspects of attitudes toward plagiarism. The first factor reflected approval of plagiarism and was therefore named "positive attitude towards plagiarism." The second factor reflected clear disapproval of fraudulent scientific community and was named "negative attitude towards plagiarism." The third factor reflected respondents' normative beliefs about plagiarism and their perceptions of its prevalence in the academic and scientific community, and was therefore named "subjective norms towards plagiarism."

To match each statement with one of these factors, another PCA was performed with 3 factors only. Oblimin rotation was performed because the orthogonal rotation did not provide meaningful results. Seven items not fitting any of the 3 factors were deleted from the ATP questionnaire and excluded from further analysis. Among the remaining 29 statements, compared with 36 in the original version, 5 items had a factor loading higher than 0.30 for more than one factor (Table 1). Therefore, we calculated the reliability of each factor when each item was deleted. Finally, we obtained the ideal three-factor structure with 12 items for the first factor, 7 for the second, and 10 items for the third factor with high reliability (>0.70) for each of them and satisfactory inter-factor correlation (~.25).

The ATP questionnaire was tested and validated in Croatian. For the continuation of our research and use in future studies it was translated into English language. One of the authors (M.M.), another fluent English-speaking researcher connected with the research, and a professional translator made three independent translations of the questionnaire. The first author, together with the professional translator, made a final synthesis of the English version.

Statistics

Statistical analyses were performed using SPSS version 16.0 (SPSS Inc., Chicago, IL, USA). To identify questionnaire construct validity, PCA with oblimin rotation was used, including Scree-plot. Pearson correlations were calculated between factors. The reliability of the factors was based on Cronbach α . The α -error level was set to 0.05.

RESULTS

Factor structure of the ATP questionnaire

PCA with oblimin rotation was used to obtain the factor structure of the questionnaire with high internal con-

sistency. The number of factors to retain was determined based on construct validity (Scree-test) and interpretability criteria. The resulting factors had eigenvalues of 9.18, 1.94, and 1.47 and the factor loadings exceeded 0.35, showing minimal overlap among factors. The final analysis yielded 29 items with 3 factors: factor I – positive attitude toward plagiarism; factor II – negative attitude toward plagiarism; and factor III – subjective norms toward plagiarism (Table 1). All three factors explained 43% of questionnaire variance.

The subscales' reliability was calculated by Cronbach α , which was found to be satisfactory (>0.70) for all the factors (Table 1).

Correlations between three factors

Correlations obtained from the factor analysis revealed that positive attitude toward plagiarism negatively correlated with negative attitude toward plagiarism ($r=-0.37$)

TABLE 1. Factor structure of the Attitudes Toward Plagiarism questionnaire with factor loadings

Factors	Items	Factor loadings*		
		I	II	III
Positive attitude toward plagiarism ($\alpha=0.83$)[†]				
	1. Sometimes one cannot avoid using other people's words without citing the source, because there are only so many ways to describe something.	0.78		
	2. It is justified to use previous descriptions of a method, because the method itself remains the same.	0.66		
	3. Self-plagiarism is not punishable because it is not harmful (one cannot steal from oneself).	0.62		
	4. Plagiarized parts of a paper may be ignored if the paper is of great scientific value.	0.59		
	5. Self-plagiarism should not be punishable in the same way as plagiarism is.	0.53		
	6. Young researchers who are just learning the ropes should receive milder punishment for plagiarism.	0.53		
	7. If one cannot write well in a foreign language (eg, English), it is justified to copy parts of a similar paper already published in that language.	0.53		
	8. I could not write a scientific paper without plagiarizing.	0.44		
	9. Short deadlines give me the right to plagiarize a bit.	0.41	-0.38	
	10. When I do not know what to write, I translate a part of a paper from a foreign language.	0.38		
	11. It is justified to use one's own previously published work without providing citation in order to complete the current work.	0.38		
	12. If a colleague of mine allows me to copy from her/his paper, I'm NOT doing anything bad, because I have his/her permission.	0.36		
Negative attitude toward plagiarism ($\alpha=0.79$)[†]				
	13. Plagiarists do not belong in the scientific community.		0.70	
	14. The names of the authors who plagiarize should be disclosed to the scientific community.		0.69	
	15. In times of moral and ethical decline, it is important to discuss issues like plagiarism and self-plagiarism.		0.68	
	16. Plagiarizing is as bad as stealing an exam.		0.62	
	17. Plagiarism impoverishes the investigative spirit.		0.60	
	18. A plagiarized paper does no harm science.		-0.53	
	19. Since plagiarism is taking other people's words rather than tangible assets; it should NOT be considered as a serious offense.	0.37	-0.47	
Subjective norms toward plagiarism ($\alpha=0.85$)[†]				
	20. Authors say they do NOT plagiarize, when in fact they do.			-0.76
	21. Those who say they have never plagiarized are lying.			-0.65
	22. Sometimes I'm tempted to plagiarize, because everyone else is doing it (students, researchers, physicians).			-0.59
	23. I keep plagiarizing because I haven't been caught yet.			-0.53
	24. I work (study) in a plagiarism-free environment.			0.52
	25. Plagiarism is not a big deal.		-0.39	-0.47
	26. Sometimes I copy a sentence or two just to become inspired for further writing.	0.33	-0.45	
	27. I don't feel guilty for copying verbatim a sentence or two from my previous papers.		-0.42	
	28. Plagiarism is justified if I currently have more important obligations or tasks to do.		-0.41	
	29. Sometimes, it is necessary to plagiarize.	0.36	-0.38	

*Factor loadings value for factors I, II, III. Only values >0.30 , which are considered satisfactory, are noted.

[†]Cronbach α value

and with subjective norms toward plagiarism ($r=-0.41$). Negative attitude toward plagiarism positively correlated with subjective norms toward plagiarism ($r=0.32$).

DISCUSSION

We developed the ATP questionnaire as a useful tool for measuring attitudes toward plagiarism. The three-factor structure of the questionnaire confirmed its psychometric characteristics: good internal consistency and good construct validity. Our analysis demonstrated the existence of 3 independent factors describing different aspects of plagiarism. This three-factor structure was not anticipated. The first factor, positive attitude toward plagiarism, reflects approval and justification of such behavior. Items from the first factor describe various situations in which plagiarism is considered to be an acceptable act of minor importance.

The second factor, negative attitude toward plagiarism, expresses condemnation and disapproval of plagiarism. Items included in this factor reflect deprecation of plagiarists and emphasize the importance of the negative influence of plagiarism in the academic and scientific communities.

The third factor, subjective norms, expresses common thinking about the prevalence of plagiarism and the acceptance of such behavior in the academic and scientific communities. According to Ajzen's TBP model (26), behavior is influenced not only by attitudes but also by subjective norms that are confirmed in this study as the third factor. Subjective norms reflect the perceived social pressure to be involved or not in a certain behavior. Nevertheless, for a better understanding of plagiarism, it is important to detect positive and negative attitudes and subjective norms toward plagiarism as well.

Subjective norms toward plagiarism negatively correlate with positive attitude toward plagiarism. The correlation confirms that a perceived high rate of plagiarism in society and lack of punishment for such behavior is connected with positive attitude toward plagiarism. At the same time, negative attitude is positively correlated with subjective norms toward plagiarism and negatively correlated with positive attitude, as expected according to the TPB model.

For the development of the ATP questionnaire, the TPB model was chosen for its powerful and predictive value in explaining human behavior. The TPB model has proven to be suitable for evaluation of beliefs, attitudes, behavioral in-

tentions and behavior in public relations, advertising, and health care; it is also appropriate for predicting dishonest intentions and actions such as cheating or lying (27). Most theories explain behavior through the individual cognitive space, while the TPB model takes into consideration social influence based on culture-related variables (23,26).

The limitations of the present study originate mainly from general limitation of the TPB model and limitations of collecting data using questionnaires. Questionnaire data are based on self assessments instead of objective measurement (26,28). In addition, the TPB model overlooks the influence of emotional factors that affect behavior. Nevertheless, although emotional factors have proven to be important for predicting health-related behaviors, they are not as important for predicting dishonest behavior (27). In our questionnaire, we examined the cognitive processing excluding the irrational and emotional factors. However the power of irrational and emotional factors is questionable in prediction of dishonest behavior (26,29).

In developing the questionnaire, perceived behavioral control was not examined for various reasons. Perceived behavioral control presumes that an individual believes himself capable of carrying out a specific behavior. The ease with which plagiarism is facilitated by the internet technology implies that everyone can plagiarize (11). Many studies confirmed that attitudes and subjective norms correlated with behavioral intention, and subsequently with behavior itself (23,30). Another limitation of the study is the fact that validation of the ATP was done using the Croatian language version of the questionnaire.

The discernible rate of plagiarism among medical students (3,4) suggests that medical doctors and scientists in biomedicine may engage in the same behavior. Clear guidelines, target education in scientific integrity, and awareness of the possible consequences seem to be very important steps in maintaining research and academic integrity. In order to prevent plagiarizing, we are still trying to identify the reasons why scientists plagiarize. All human behaviors are influenced by normative, control, and behavioral beliefs that affect subjective norms, perceived behavioral control, and attitudes (20). Favorable or unfavorable attitudes toward plagiarism are the product of personal behavioral beliefs and cultural environment. In the scientific community, we can be almost certain that perceived behavioral control is substantial and subjective norms are thought to be unfavorable. Therefore, to have a better understanding of plagiarism, we should examine

attitudes toward plagiarism. Because attitudes cannot be directly observed (such as behavior), they have to be inferred from observable responses from standardized questionnaires (26).

Finally, the objective assessment of prevalence of plagiarism and of attitudes toward plagiarism must be carried out simultaneously to develop a predictive model that can be used for preventing plagiarism. The construction of a standardized questionnaire that assesses attitudes toward plagiarism and subjective norms is a step forward toward plagiarism prevention. Thus, results obtained from studies using this questionnaire should provide evidence for better understanding of this type of misconduct.

Acknowledgment

L. B.-Z. and M.P. are statistical editors in the CMJ. To ensure that any possible conflict of interest has been addressed, this article was reviewed according to best practice guidelines of international editorial organizations. This study is part of the scientific project "Prevalence and attitude towards plagiarism" (No. 062-0000000-3552) supported by the Croatian Ministry of Science, Education, and Sports. The authors are grateful to Vladimir Takšić, PhD, and Silvijia Ručević, MSc, for assistance with statistics, and Lana Hudeček, PhD, for language editing of the Croatian version of the questionnaire. We also thank Nino Stojković, PhD, and Vanja Pupovac for help in data collection, and Ksenija Baždarić for help in the translation.

References

- 1 Ardalan F, Arfaei H, Mansouri R, Balalimood M, Farhud D, Malekzadeh R, et al. Iran's scientists condemn instances of plagiarism. *Nature*. 2009;462:847. [Medline:20016576 doi:10.1038/462847a](#)
- 2 Chalmers I. Role of systematic reviews in detecting plagiarism: case of Asim Kurjak. *BMJ*. 2006;333:594-6. [Medline:16974016 doi:10.1136/bmj.38968.611296.F7](#)
- 3 Rennie SC, Crosby JR. Are "tomorrow's doctors" honest? Questionnaire study exploring medical students' attitudes and reported behaviour on academic misconduct. *BMJ*. 2001;322:274-5. [Medline:11157528 doi:10.1136/bmj.322.7281.274](#)
- 4 Bilić-Zulle L, Frkovic V, Turk T, Azman J, Petroveckí M. Prevalence of plagiarism among medical students. *Croat Med J*. 2005;46:126-31. [Medline:15726686](#)
- 5 Elzubeir MA, Rizk DE. Exploring perceptions and attitudes of senior medical students and interns to academic integrity. *Med Educ*. 2003;37:589-96. [Medline:12834415 doi:10.1046/j.1365-2923.2003.01552.x](#)
- 6 Committee on Academic Misconduct. Code of student conduct. Columbus: COAM 2007. Available from: <http://oaa.osu.edu/procedures/1.0.html>. Accessed: June 2, 2010.
- 7 Office of Research Integrity. Policy on plagiarism. Rockville: ORI 2009. Available from: <http://ori.dhhs.gov/policies/plagiarism.shtml>. Accessed: June 2, 2010.
- 8 Petroveckí M, Scheetz MD. Croatian Medical Journal introduces culture, control, and the study of research integrity. *Croat Med J*. 2001;42:7-13. [Medline:11172649](#)
- 9 Titus SL, Wells JA, Rhoades LJ. Repairing research integrity. *Nature*. 2008;453:980-2. [Medline:18563131 doi:10.1038/453980a](#)
- 10 Benos DJ, Fabres J, Farmer J, Gutierrez JP, Hennessy K, Kosek D, et al. Ethics and scientific publication. *Adv Physiol Educ*. 2005;29:59-74. [Medline:15905149 doi:10.1152/advan.00056.2004](#)
- 11 Cross M. Policing plagiarism. 2007;335:963-4.
- 12 Couzin-Frankel J, Grom J. Scientific publishing. Plagiarism sleuths. *Science*. 2009;324:1004-7. [Medline:19460978 doi:10.1126/science.324_1004](#)
- 13 Braumoeller BF, Gaines BJ. Actions do speak louder than words: deterring plagiarism with the use of plagiarism-detection software. *Political Science and Politics*. 2001;34:835-9. [doi:10.1017/S1049096501000786](#)
- 14 Martinson BC, Anderson MS, de Vries R. Scientists behaving badly. *Nature*. 2005;435:737-8. [Medline:15944677 doi:10.1038/435737a](#)
- 15 Roig M. The culture of mistrust is already with us. *The Write Stuff*. 2008;17:44.
- 16 Vasconcelos S, Leta J, Costa L, Pinto A, Sorenson MM. Discussing plagiarism in Latin American science. *EMBO Rep*. 2009;10:677-82. [Medline:19525923 doi:10.1038/embor.2009.134](#)
- 17 Goodstein DL. Conduct And Misconduct In Science. Available from: <http://www.physics.ohio-state.edu/~wilkins/onepage/conduct.html#1>. Accessed: June 2, 2010.
- 18 Hayes N, Introna L, Whitley EA. Plagiarism, values and computing: differing cultural expectations of academic work in information systems education. Available from: <http://www.lums.lancs.ac.uk/files/sdaw/5707/download/>. Accessed: June 2, 2010.
- 19 McCabe DL, Feghali T, Abdallah H. Academic dishonesty in the Middle East: individual and contextual factors. *Res Higher Educ*. 2008;49:451-67. [doi:10.1007/s11162-008-9092-9](#)
- 20 Ajzen I. Constructing a TpB Questionnaire: Conceptual and methodological considerations. 2006. Available from: <http://socgeo.ruhosting.nl/html/files/spatbeh/tpb.measurement.pdf>. Accessed: June 2, 2010.
- 21 Babbie ER. The practice of social research. Belmont: Cengage Learning, 2010. Available from: <http://books.google.com/books?id=QySynvetGQIC&pg=PT53&dq=The+Basics+of+Social+Research&hl=hr#v=onepage&q=The%20Basics%20of%20Social%20Research&f=false>. Accessed: June 2, 2010.
- 22 Harris RA. Educating yourself about plagiarism. In: Harris RA, editor.

- The plagiarism handbook: strategies for preventing, detecting, and dealing with plagiarism. Los Angeles: Pyrczak Publishing; 2001. p. 1-23.
- 23 Beck L, Ajzen I. Predicting dishonest actions using the Theory of Planned Behavior. *J Res Pers.* 1991;25:285-301. doi:10.1016/0092-6566(91)90021-H
- 24 Jordan AE. College student cheating: The role of motivation, perceived norms, attitudes and knowledge of institutional policy. *Ethics Behav.* 2001;11:233-47. doi:10.1207/S15327019EB1103_3
- 25 Nunnally JC, Bernstein LH. *Psychometric theory*, 3rd edition. New York (NY): McGraw-Hill; 1994.
- 26 Ajzen I, Fishbein M. The influence of attitudes on behaviour. In: Albarracín D, Johnson BT, Zanna MP, editors. *Handbook of attitudes and attitudes change: basic principles*. Mahwah (NJ): Erlbaum; 2005. P. 173-221.
- 27 Armitage CJ, Conner M. Efficacy of the Theory of Planned Behaviour: a meta-analytic review. *Br J Soc Psychol.* 2001;40:471-99. Medline:11795063 doi:10.1348/014466601164939
- 28 Van der Pligt J, de Vries NK. Belief importance in expectancy – value models of attitudes. *J Appl Soc Psychol.* 1998;28:1339-54. doi:10.1111/j.1559-1816.1998.tb01680.x
- 29 Dutta-Bergman M. Theory and practice in health communication campaigns: A critical interrogation. *Health Commun.* 2005;18:103-12. Medline:16083406 doi:10.1207/s15327027hc1802_1
- 30 Austin Z, Collins D, Remillard A, Kelcher S, Chui S. Influence of attitudes toward curriculum on dishonest academic behavior. *Am J Pharm Educ.* 2006;70:50. Medline:17136171