

ORIGINAL ARTICLE

Ageing simulation games: A module for enhancing students' understanding of older adults

HONG Song-Iee¹

¹ Department of Social Work

National University of Singapore

Address for Correspondence: Dr Hong Song-Iee, Department of Social Work, Faculty of Arts & Social Sciences, National University of Singapore, Blk AS3 Level 4, 3 Arts Link, Singapore 117570

Email: swkhs@nus.edu.sg

Recommended citation:

Hong, S-I (2015). Ageing simulation games: A module for enhancing students' understanding of older adults. *Asian Journal of the Scholarship of Teaching and Learning*, 5(1), 40-54.

<https://doi.org/10.24112/ajsotl.53013>

Ageing simulation games: A module for enhancing students' understanding of older adults

Abstract

Singapore's rapidly ageing population requires a sufficient number of care providers trained to aid older adults in Singapore. Accordingly, it is imperative that gerontological educators help undergraduate students overcome misconceptions about ageing and dispel any stigma associated with ageing. A simulation-related experiential-learning technique may be a suitable response to such need. This study was conducted to determine if ageing simulation games (Pacala, 2003) could yield positive results in increasing students' interest in working with older adults after graduation, change their attitudes toward older adults, broaden their gerontological knowledge, and decrease their anxiety over ageing. Thirty-nine third- and fourth-year social work students who took the elective module of *Social Gerontology* completed the ageing simulation games consisting of three sessions. Four outcomes were measured three times: during weeks one, five, and twelve. The paired t-tests proved that the module of Social Gerontology combined with ageing simulation games was effective in enhancing students' interest in, attitudes toward, and gerontological knowledge about older adults and their experiences. The module also showed a reduction in students' anxieties on ageing. Overall, the study demonstrated the effectiveness of gerontology education when combined with the innovative education method of ageing simulation games. Such games were found to be effective teaching mechanisms to help young students develop experiential learning on ageing.

INTRODUCTION

Given the rapidly ageing population in Singapore, it is becoming more critical to assure a sufficient number of social- and health-service providers for older adults. Nonetheless, many gerontological educators report that societal ageism negatively influences undergraduate students' attitudes toward older adults (Allan & Johnson, 2009). The negative impression that such students have toward older adults often jeopardizes the quantity and quality of social work professionals functioning within the gerontological practice. These students often exhibit disinterest and prejudice against working at nursing homes, day care centres for older adults, and the like. It is particularly obvious that social work students tend to rate their interest in geriatric or gerontological practice as being low in comparison with other areas such as mental health, child welfare, health, and family services (Fredriksen-Goldsen, Hooyman, & Bonifas, 2006; Olson, 2002).

With the dramatic increase in the ageing population in Singapore, social work students are likely to encounter older adults in their practice, whether or not they are directly involved in the fields of gerontology. Accordingly, gerontological educators must help undergraduate students overcome the stigma and misconceptions associated with ageing. There is a further need to provide opportunities for students to learn about the diverse challenges of working with older adults while in the field. Therefore, recent trends of gerontological education have underscored the importance of developing and employing teaching methods designed for increasing undergraduate student interest in and attention to the field of ageing.

Active learning techniques, such as simulations, games, and role-play, can provide more structured opportunities that allow students to sufficiently understand older adults' functional, physical, and environmental challenges. Such techniques also encourage students to develop their own attitudes and abilities as they relate to working with older adults (Pacala, Boulton, & Hepburn, 2006; Robinson & Rosher, 2001).

In particular, the simulation-related experiential-learning technique emphasizes students' own experience in learning about ageing. This simulation technique was found to elicit much higher levels of enthusiasm for and satisfaction with ageing courses that provide experiential learning to students (Pacala, Boulton, & Hepburn, 2006). For this reason, young students' ageing-simulation-based experiential learning can be beneficial in increasing students' capabilities as they learn about older adults and ageing.

Unlike traditional instructional methods in which learners passively receive information, many gerontological educators have reported that ageing simulation games offer several advantages as learning tools in gerontology-specific courses (Evans, Lombardo, Belgeri, & Fontane, 2005; Schmalla, Grabinski, & Bowmanc, 2010; Tumosa & Morley, 2006). They:

- (1) motivate and stimulate students' learning by appealing to their interest in and enthusiasm for games;
- (2) actively involve students in the learning process by promoting the act of discovery;
- (3) privilege progressive and responsive thinking over passive reception of information;
- (4) bring simulated real-world settings and experiences into the classroom;
- (5) increase students' empathic understanding and level of compassion, both of which are important in working effectively with older adults and their families;
- (6) allow students to experience, from older adults' perspectives, such situations as late-life changes, adaptations, and losses;
- (7) encourage students to analyze critically their personal attitudes and beliefs about ageing by stimulating students' behavioral responses to the simulated circumstances

of older adults;

(8) improve students' cognitive learning and information retention by effectively enhancing students' long-term memory of the ageing experience; and

(9) strengthen students' process skills by providing insight into communication, decision-making, problem-solving, strategizing, planning, and allocating resources.

OBJECTIVES OF AGEING SIMULATION GAMES

By combining the *Social Gerontology* module with the ageing simulation game, I aimed:

(1) to increase social work students' interest in working with older adults after graduation;

(2) to enhance students' positive attitudes toward older adults;

(3) to improve students' gerontological knowledge; and

(4) to reduce students' anxiety about ageing.

MATERIALS AND METHOD

The Study Subjects

Thirty-nine third- and fourth-year social work students who took the elective module of *Social Gerontology* were invited to participate in this study.

Table 1 depicts the participants' personal and demographic details. The average age of the students was 23 years. A majority of them were females, Chinese, and fourth-year students. Approximately 62% had at least one experience working with older adults through their practicum, internships, and volunteer work. In addition, nearly 44% had completed an ageing-related module before taking the *Social Gerontology* course during the semester. About 77% had lived with older adults and of those students, eighteen percent still live with older adults. Around 13% responded that they talked with older adults on a daily basis, and above half of the students (56%) reported that they talked with older adults more than once a week.

Table 1. Sample Characteristics (n=39)

Sample Characteristics	Measurement	N (%)	Mean (SD, Range)
Age	Number of years		22.67 (1.30, 21-28)
Gender	Male	3 (7.69)	
	Female	36 (92.31)	
Ethnicity	Chinese	34 (87.18)	
	Malay	3 (7.69)	
	Indian	2 (5.13)	
	Others	0 (0)	
Year of Study	Third year	9 (23.08)	
	Fourth year	30 (76.92)	
Experience working with older adults	Yes	24 (61.54)	
	No	15 (38.46)	
Taking any ageing-related module	Yes	17 (43.59)	
	No	22 (56.41)	
Live with an older adult	Never lived together	9 (23.08)	
	Had lived together but not now	23 (58.97)	
	have lived together until now	7 (17.95)	
Frequency of talking with older adults	7: Daily	5 (12.82)	
	6: Several times a week	10 (25.64)	
	5: Once a week	7 (17.95)	
	4: Several times a month	9 (23.08)	
	3: At least once a month	4 (10.26)	
	2: Several times a year	4 (10.26)	
	1: At least once a year	0 (0)	

Teaching Method

Social Gerontology (SW4208):

This module covers the physiological, psychological, and socio-cultural contexts of ageing and the related implications for individuals, families, and societies. Gerontological interventions and their impact on older adults' well-being are discussed to increase students' awareness and understanding of gerontological issues in a seminar style. Through interactive seminars, the students learn about the biopsychosocial-needs assessment of older adults, the problems and theories of ageing, social services and policies on long-term care, caregiving, retirement and re-employment, income security,

housing, and social activity. A total of 13 three-hour seminars were conducted once a week during the semester.

Socio-demographics

The pretest questionnaire elicited information about participants' demographics (age, gender, and race), education, major, minor, experience working with older adults, prior and current living arrangements with older adults, and frequency of talking with older adults.

Ageing Simulation Games

The ageing simulation games consisted of three sessions involving role play.

Session I. All instructions were explained before students played the ageing simulation games [25 minutes]. Each team was made up of three students - students A, B and C. In each team, Student A, who played the role fo the ageing adult, was asked to wear the equipment specially designed for them (Figure 1).



Figure 1. Ageing Simulation Equipment

Student B facilitated Student A to safely experience the games. Detailed instructions on common every day scenarios were evoked so that students could experience, while in the classroom, the changes older adults experience in relation to their sight, hearing, touch, dexterity, and grip strength. Student C recorded their observations and narrative descriptions of Student A's behaviours during the role-play.

Session II. Each team went out to a public area (outside of the classroom) in order to get a first hand experience of the changes in mobility and balance that the older adults encountered when undertaking daily activities such as climbing stairs, walking along the sidewalk, crossing the road, going to school canteens, and searching for information in the library. Student B supervised Student A to ensure Student A's safety in these settings. Student C observed and recorded student A's ageing-simulation process. These activities took about an hour outside of the classroom.

Session III. Students presented their reflections on their experience of the ageing

simulation games inside and outside of the classroom and then completed the post-test survey [35 minutes]. They were asked to write a short essay while reviewing their records with team members at home.

Measurement of Outcomes

Using standardized instruments, this study measured four key outcomes expected from this module on social gerontology:

- (1) student interest in working with older adults after graduation;
- (2) student attitudes towards older adults;
- (3) student knowledge of gerontological concepts; and
- (4) student anxiety about ageing.

Interest in working with older adults after graduation. Students' interest was measured by means of a single item from the studies of Olson (2002) and of Snyder and colleagues (2008). This question was modified to ask about participants' interest in working with older adults after they graduate. The question asked students to rank their responses on a scale of one to four: (1) I would not like it; (2) I doubt I would like it; (3) I am undecided as to whether I would like it; and (4) I would really like it.

Attitudes toward older adults. Two measures were used to assess students' attitudes toward older adults. First, the University of California, Los Angeles (UCLA), Geriatrics Attitudes Scale (GAS), which used first-year medical students, has been validated for measuring attitudes towards older adults in Singapore (Chua, Tan, Merchant, & Soiza, 2008). Because a majority of gerontological social workers are working in health care areas such as hospitals and nursing homes in Singapore, a modified version of this instrument was used to measure fourth-year social work students who are taking *Social Gerontology* as an elective course. Modifications to six other questions were made so that the questionnaire reflected Singaporean and social work contexts. The following changes were made: (1) 'government' replaced 'federal government'; (2) 'health care' replaced 'medicare' or 'medical care'; (3) 'client/s' replaced 'patient/s'; (4) 'needs assessment' replaced 'medical history'; (5) 'health care for children' replaced 'pediatric diseases'; and (6) 'older adults' replaced 'elderly person'. The addition of 'I believe' was also made to Question 8, as students did not have any prior clinical experience. Lastly, a total of 14 items with a five-point Likert scale were computed to generate the degree of positive attitudes toward older adults by converting negatively worded questions into positive coding.

Second, the Ageing Semantic Differential (ASD) scale was used to assess attitudes toward older adults (Polizzi, 2003). The list of 24 polar-opposite adjectives on a seven-point scale generated a summative score in the final analysis, higher scores indicate

negative images of or attitudes towards older adults.

Gerontological knowledge. The “Facts on Ageing Quizzes” I and II developed by Palmore (1981, 1982, 1998, and 2001) were combined to measure students’ level of knowledge on gerontology. A total of 38 questions were asked, and only the correct answers were tallied, with higher scores representing students’ higher levels of knowledge on gerontology.

Anxiety about ageing. The anxiety scale was adopted from Lasher and Faulkernder’s (1993) study on the measurement of ageing anxiety. Twenty items were assigned a five-point scale. Of them, six items denoted a negative response. The original scale was designed to show higher scores as representing lower levels of anxiety. However, this study recorded the items to indicate that higher scores mean higher levels of anxiety. This method made for a more consistent interpretation of the findings.

Research Design and Data Collection

Although most existing ageing simulation studies have used only pre-and post-tests (Varkey, Chutka, & Lesnick, 2006; Henry, Douglass, Kostiwa, 2007; Koh, Merchant, Lim, & Amin, 2012), this ageing simulation study was designed to include three repeated tests in order to have greater internal validity: a pre-test (before the ageing simulation games), a post-test (right after the ageing simulation game), and a follow-up test (8 weeks after the ageing simulation games). Because this activity was part of the class exercise and the size of the class was small, it was impossible to set a control or comparison group.

As a class activity, students played the ageing simulation games using special equipment. They were given the questionnaires three times:

- (1) at the first class before the ageing simulation game (Wave I);
- (2) during the fifth week when the games were performed (Wave II); and
- (3) before the last class of the semester (Wave III).

The survey questionnaire consisted of standardized instruments and one open-ended question. Students were given 15 minutes to complete this assessment.

Before conducting the experimental games, the participant information sheet and consent form, which detailed the purposes and processes of the ageing simulation game, were provided to each student. All research processes were examined and monitored by NUS-IRB whose approval was obtained prior to the beginning of the course (Reference # 12-425).

Statistical Analysis Plan

The summative scores tallied from the standardized instruments were analyzed through descriptive statistics and paired t-tests. The paired t-tests were employed to examine statistical differences in outcome measures before and after the students participated in the ageing simulation game and completed all lessons from the module of *Social Gerontology* for the semester. The results demonstrate how effective the ageing simulation game and the lessons from this module are in terms of enhancing students' gerontological knowledge, developing students' positive attitude toward older adults, increasing students' interest in working with older adults professionally, and reducing students' anxiety about ageing.

Furthermore, the students' short essay responses to the open-ended question helped to modify and advance the implementation of ageing simulation games. This additional information is expected to strengthen the existing instruments, simulation activities, and research design for future applications.

RESULTS

Changes in the four measured outcomes took place across all three Waves, as shown in Tables 2, 3, and 4.

Interest in Working with Older Adults after Graduation

Table 2. Students' Interest in Working with Older Adults at Practice Post-graduation as measured across three waves (n=39)

Students' Interest in Working with Older Adults at Practice	Measurement	Wave I	Wave II	Wave III
		N (%)	N (%)	N (%)
	1: I would not like it	0 (0)	0 (0)	0 (0)
	2: I doubt I would like it	11 (28.21)	7 (17.95)	5 (12.82)
	3: I am undecided as to whether I would like it	16 (41.03)	16 (41.03)	15 (38.46)
	4: I would really like it	12 (30.77)	16 (41.03)	19 (48.72)

Table 2 demonstrates the changes in students' expressed interest in working with older adults after they graduate. Over the semester, the number of students who doubted that they would like working professionally with older adults decreased from 28% to 13%. Those who said they would like working with older adults increased from 31% to 49%. Positive changes in students' interest were also noted soon after conducting the ageing simulation games. These changes, which were measured at Wave II, were more apparent than the changes that took place between Waves II and III, suggesting that more students responded positively between the second and third waves than in Wave I.

In addition, the positive changes from Wave I to Wave II were statistically significant, as shown in Table 4. Overall, students' interest in working with older adults increased throughout the whole semester, indicating that the differences between Waves I and III were significant, though the changes from Wave II to Wave III did not demonstrate that significance statistically.

Attitudes toward Older Adults

The two measures used to assess students' attitudes toward older adults, the GAS and ASD, also demonstrate positive changes:

Table 3. Outcome Measures from Ageing Simulation Games as measured across three waves (n=39)

Outcome Measures	<u>Wave I</u>	<u>Wave II</u>	<u>Wave III</u>
	Mean (SD, Range)	Mean (SD, Range)	Mean (SD, Range)
Gerontological Positive Attitudes (GAS)	53.18 (4.42, 43-63)	53.56 (4.71, 46-63)	55.95 (7.91, 46-62)
Gerontological Negative Attitudes (ASD)	83.72 (9.39, 64-101)	83.35 (8.81, 64-96)	72.05 (14.32, 41-97)
Gerontological Knowledge	18.67 (3.52, 9-26)	19.97 (3.11, 17-29)	24.31 (3.46, 17-31)
Anxiety about Ageing	37.23 (7.37, 16-49)	37.72 (7.56, 16-51)	35.25 (6.90, 23-45)

As shown in Table 3, the scores in GAS increased across three waves and those in ASD decreased. The findings on both measures, therefore, indicate that students' attitudes toward older adults were positively changed over the course of the semester as a result of their participation in the ageing simulation games.

Specifically, according to the paired-tests' results in Table 4, the effect of the ageing simulation games seemed to heighten the scores in the GAS. The scores in the ASD were also more likely to change after the ageing simulation games, though these changes seemed to be influenced more by the lessons of the module than by the ageing simulation games themselves. However, paired t-tests in both measurements confirmed students' positive, significant changes in their attitudes toward older adults from Wave I to Wave III.

Table 4. Paired t-tests on changes between Waves I & II, Waves II & III, and Waves I & III (n=39)*Note: *p<0.05; **p<0.01; ***p<0.001*

Outcome Measures	Waves I & II		Waves II & III		Waves I & III	
	t score (df)	p-value	t score (df)	p-value	t score (df)	p-value
Gerontological Positive Attitudes (GAS)	2.20 (38)	0.03	1.75 (38)	0.09	2.09 (38)	0.04
Gerontological Negative Attitudes (ASD)	-1.97 (38)	0.05	-5.26 (38)	<0.001	-5.37 (38)	<0.001
Gerontological Knowledge	3.65 (38)	0.00	7.72 (38)	<0.001	9.94 (38)	<0.001
Anxiety about Ageing	3.05 (38)	0.00	-2.74 (38)	0.01	-2.26 (38)	0.03
Interest in working with older adults	3.13 (38)	0.00	1.40 (38)	0.17	3.14 (38)	0.00

Gerontological Knowledge

The “Fact on Ageing Quizzes” I and II measured students’ gerontological knowledge as augmented through the *Social Gerontology* module. From the beginning of the class, students’ knowledge gradually increased, as indicated in an increase in the mean scores of the “Fact on Ageing Quizzes” I and II across all three waves (Table 3). In particular, students’ knowledge was dramatically augmented between Waves II and III in the mean scores. These longitudinal changes were statistically significant as tested by paired t-tests. Both class content and the ageing simulation games seemed to be effective at increasing students’ gerontological knowledge.

Anxiety about Ageing

As shown in Table 3, students’ anxiety about ageing slightly increased after the ageing simulation game but then decreased by the end of class. Paired t-tests in Table 4 present these changes as also being statistically significant.

DISCUSSION AND IMPLICATION

Throughout the module of *Social Gerontology* combined with the ageing simulation games, I found significant changes in the four outcomes tested in this study:

- (1) students’ interest in working with older adults after graduation;
- (2) students’ attitudes toward older adults;

- (3) students' gerontological knowledge; and
- (4) students' anxiety about ageing.

Specifically, both the ageing simulation game and the module itself seemed to have heightened students' interest in working with older adults, increased their positive attitudes towards older adults, and their knowledge of gerontology. In addition, the ageing simulation game may have increased students' immediate anxiety on ageing, but the module of *Social Gerontology* following these games helped students to reduce their anxiety levels over the semester.

Similar to the findings of other empirical studies on ageing simulation games (Pacala, Boulton, Hepburn, 2006; Koh, Merchant, Lim, & Amin, 2012; Varkey, Chutka, & Lesnick, 2006), the findings of this study confirm that the ageing simulation games offered by this module were effective teaching mechanisms for young students to develop their experiential learning on ageing. In addition, the module of *Social Gerontology* was effective at enhancing students' interest, positive attitudes, and gerontological knowledge. In particular, the module helped to reduce the students' mild anxieties about aging that had earlier been aroused by the ageing simulation games.

Through its experimentation with ageing simulation games, this study found that it is possible for students' interest in professionally working with older adults to increase. In particular, the changes from Waves I to II and Waves I to III were statistically significant, but the changes from Waves II to III were marginal. The findings in Table 4 highlight the notable contribution of the ageing simulation games to the increase of students' interest in ageing and older adults. That is, these findings imply the usefulness of experiential learning for young students enrolled in gerontological subjects.

In relation to students' gerontological attitudes, this module was effective at improving students' positive attitudes as measured by GAS and ASD. Interestingly, the score changes in GAS were more influenced by the ageing simulation games from Waves II to III than those in GAS. The GAS, which is designed to gauge general impressions or images rather than to elicit personal opinions about specific situations, was more sensitized from the ageing simulation games than from the lessons. Therefore, the ageing simulation games may provide helpful tips on how to understand general situations more so as to cause a change in the general image students have of older adults.

The statistical results on students' gerontological knowledge significantly corroborate the effectiveness of the module contents and ageing simulation games. Students' gradual improvement in knowledge until the end of class was impressive and may correlate with their increased interest in this subject. In order to produce social and health service providers in gerontological practice, it is imperative that young students are educated with the relevant gerontological knowledge before they graduate. To have a more long-term understanding of this effect, future research needs to test how students' interests and career choices are associated with their knowledge.

Interestingly, the findings on students' anxiety showed unexpected trends over time. Indeed, the ageing simulation games increased students' anxiety about ageing which was very similar to Henry et al's (2007) study. Based on this similar finding, Henry

et al. suggested that ageing simulation games needed to be combined with reflective debriefing and interaction with older adults.

In my experimentation, these two components were more intensified throughout the remaining sessions of classes and student class projects. This was effectively reflected in the students' reduced levels of anxiety measured at the end of the last class. That is, when performing the ageing simulation games, most of the students realized for the first time older adults' physical burden when they were asked to wear the specially designed equipment (Figure 1). This confrontation with a real experience through ageing simulation appeared to be daunting to young students. However, this striking experience also gave them a better understanding of older adults' physical and emotional hardships and may eventually bring a deep emphasis to and help heighten their understanding of the necessity of gerontology. Students might initially ponder the fundamental question of why we need to study ageing and older adults. After participating in the ageing simulation games, students may gain more interest in learning how to cope with such challenges, and as their knowledge broadens, their anxieties about ageing will possibly diminish. Nonetheless, to empirically explain why this study found such fluctuating trends on students' anxiety about ageing, more analytical tests should be conducted to verify the theoretical relationship between anxiety about ageing and the incremental gerontological knowledge.

LIMITATIONS OF THIS STUDY AND SUGGESTIONS FOR A FUTURE TRIAL

Despite the impressive findings, the design of the study limits the validity and reliability of the findings to some extent. The main weakness is the internal validity of causation. This study could not be designed as an experimental study with a control group because of the small class size. Future studies with larger class sizes should help overcome this weakness and help establish the causality between ageing simulation games and the outcomes of this study. In addition, a longitudinal comparison between those who take the module of *Social Gerontology* and those who do not take the module of *Social Gerontology* can be more robust and, thereby, validate the module's effectiveness on the outcomes measured.

The immediate effectiveness of the experimentation of ageing simulation games might be due to the Hawthorn Effect, which means that students' attitudinal changes might be driven by their motivation to show desirable responses to class activities or reactions to the lecturer's interests or expectations rather than their responses to the nature of the experimentation itself. Therefore, future studies are required to evaluate social work students' behavioral changes in actual practice settings. As these learners become practitioners, their behaviour could depend on their interpretation and application of learning from the ageing simulation games into the situation.

Other limitations and suggestions were discovered through the review of students'

feedback in the open-ended question and short essays, which found areas to improve on in the implementation of ageing simulation games. Limitations were found with respect to equipment and allotted space and time.

More equipment. Because there was an insufficient number of ageing-simulation equipment, students wore only half of the set and too many students were assigned to each team. Eventually, there was no chance to simulate the games for all students. At the very least, teaching instruments should be sufficiently prepared to maximize the educational effect.

More space. Students pointed out that the classroom was too small for efficient maneuvering of a wheel chair and rotating of different games, which caused disruptiveness and overcrowding throughout the process. They felt that a more spacious room was required. Also students expressed a keen desire to explore public areas and real-life spaces. Such changes in conducting the course would be more conducive to increasing students' empathic understanding of older adults. In bringing about these changes, the design of ageing simulation games should also consider supplementary safety measures for students.

More time. Students found a three-hour session to be insufficient for completion of all assignments. In particular, students felt that out-of-classroom simulation (one hour) and the debriefing (20-25 minutes) should be extended, with more time allocated for each.

The future experimentation and redesigning of the ageing simulation games should take into consideration all of the above comments in order to ensure the module's advancement and success.

CONCLUSION

This study found that the module of *Social Gerontology* and ageing simulation games positively impacted social work students' interest, attitudes, and knowledge. In considering the unprecedented growth of the ageing population and the lack of gerontology education in Singapore, the study demonstrated the effectiveness of gerontology education combined with an innovative educational method of ageing simulation games. Such experiential learning on gerontology for young students thus bridges the gap between young students' interest and gerontology education.

REFERENCES

- Allan, L. J. & Johnson J. A. (2009). Undergraduate attitudes toward the elderly: The role of knowledge, contact, and ageing anxiety. *Educational Gerontology*, 35, 1-14.
- Chua, M., Tan, C. H., Merchant, R., & Soiza, R. L. (2008). Attitudes of first-year medical students in Singapore towards older people and willingness to consider a career in geriatric medicine. *Annals of Academic Medicine*, 37(11), 947-951.
- Evans, S., Lombardo, M., Belgeri, M., & Fontane, P. (2005). The geriatric medication game in pharmacy education. *Journal of Pharmaceutical Education*, 69(3), 304-310.
- Fredriksen-Goldsen, K. I., Hooyman, N. R., & Bonifas, R. P. (2006). Special Section: Innovations in gerontological social work education multigenerational practice: An innovative infusion approach. *Journal of Social Work Education*, 42(1), 25-36.
- Henry, B., Douglass, C., Kostiwa, I. (2007). Effects of participation in an ageing game simulation activity on the attitudes of allied health students toward older adults. *The Internet Journal of Allied Health Sciences and Health*, 5(4), 1-9
- Koh, G., Merchant, R.A., Lim, W.S., & Amin, Z. (2012). The knowledge-attitude dissociation in geriatric education: Can it be overcome? *Annals Academy Medicine Singapore*. 41(9), 383-389.
- Lasher, K. P. & Faulkernder, P. J. (1993). Measurement of aging anxiety: Development of the anxiety about aging scale. *International Journal of Ageing and Human Development*, 37(4), 247-259.
- Olson, C. J. (2002). A curriculum module enhances students' gerontological practice-related knowledge and attitudes. In M. J. Mellor & J. Ivry (Eds.), *Advancing gerontological social work education* (pp. 159-176). New York: Haworth.
- Pacala, J. (2003). Aging game video and manual. *Caregiver Video Library*. Santa Monica, CA: Wiland-Bell Productions.
- Pacala, J. T., Boulton, C. B., Hepburn, K. T. (2006). The years' experience conducting the aging game workshop: was it worth it? *Journal of the American Geriatrics Society*, 54, 144-149.
- Palmore, E. (1981). The facts on ageing quiz, part two. *The Gerontologist*, 4, 431-437.
- Palmore, E. (1982). Attitudes toward the aged: What we know and need to know. *Research on Aging*, 4, 333-348.
- Palmore, E. (1998). *The facts on aging quiz* (2nd ed). New York: Springer.
- Palmore, E. B. (2001). The ageism survey: First findings. *The Gerontologist*, 41(5), 572-575.
- Polizzi, K. G. (2003). Assessing attitudes toward the elderly: Polizzi's refined version of the ageing semantic differential. *Educational Gerontology*, 29(3), 197-216.
- Schmalla, V., Grabinski, C. J., Bowman, S. (2010). Use of games as a learner-centered strategy in gerontology, geriatrics, and aging-related courses. *Gerontology & Geriatrics Education*, 29(3), 225-233.
- Snyder, C. S., Wesley, S. C., Lin, M. B., and May, J. D. (2008). Bridging the gap: Gerontology and social work education. *Gerontology & Geriatrics Education*, 28 (4), 1-21.
- Tumosa, N., & Morley, J. E. (2006). The use of games to improve patient outcomes. *Gerontology & Geriatrics Education*, 26 (4), 37-45.
- Varkey, P., Chutkan, D. & Lesnick, T. (2006). The aging game: Improving medical students' attitudes toward caring for the elderly. *Journal of American Medical Directors Association*. 7, 224-229.