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Metaverse Technology that Employs Role-Playing in Self-Reflection to Promote Self-esteem among Adolescents

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Abstract

This article aimed to propose the results of a study of adolescent self-esteem by placing importance on communicational development in order to live with other people, expression in different situations using role-playing and reflection, physical, verbal, emotional, and mental self-control in a concurrent manner. The concept of the study on the correlation of these components was derived from literature reviews and previous research where an individual is confident in himself, respect himself and other people, and live a purposeful life through thinking and self-assessment processes with both intrinsic and extrinsic factors of such individual being characterized to strengthen pride and self-esteem of adolescents.The present study employed a quantitative research method while the sample group used consisted of 442 adolescents aged 15-18 years. The tool adopted was a demand questionnaire and the data were analyzed using the Structural Equation Modeling (SEM). The results of the study found that the model consisted of one exogenous latent variable, namely role-playing, and three endogenous latent variables, namely 1) reflection, 2) metaverse, 3) self-esteem. The model was consistent with the empirical data, Chi-Square = 98.82, df=80, p = 0.075, RMSEA = 0.023.

Keywords: Metaverse Technology, Role-Playing, Reflection, Self-Esteem

INTRODUCTION

The self-improvement of young people, both physically and mentally, is important and enables people to learn about themselves and others.

Bringing his heart to our attention is a word that is being used now and in the future. Knowing how to adapt to situations and being able to control one's physical, verbal, emotional and mental expression appropriately both verbal and non-verbal forms simultaneously (Andreea-Maria, Larisa-Andreea, & Iasmina, 2020). In which both forms can be realized and delivered creatively. The person himself needs to process and distill into words and gestures that can make people understand correctly to be effective (Kelly, Nixon, Broadfoot, Hofmeister, & Dornan, 2019; Chonticha Bumrungrak, 2018).

Globalization through metaverse communications is deployed in the education system. Jaithip Na Songkhla (2021) broadened a perspective on communication technology as a shift in social interactions that use communication to connect objects and environments, thus giving a feeling of being like a real person that interacts with the environment, atmospheric objects, as it uses a graphic stimulus that has dimensions based on an actual environmental context, making one feel connected and engaged in a real society. Moreover, education is a branch of society; therefore, metaverse is an important paradigm shift in education, along with training on role-playing that is a behavior that conforms to status. A role is a behavior that society defines and expects a person to act according to the behavioral function they perform. Role is hence one of the mechanisms of society that allows people who live together to build a system of relationships with each other in an order and decent manner (Ari & Munassar, 2020; Ng, 2020) with reflection being the center of human learning and personal development. Responding through the method of reflection effectuates situational changes that are overwhelmed with anxiety, doubt, conflict, into a situation that is easily understandable, clear, and requires less efforts to make decisions and engage in collaboration (Redmond, 2004; Pedro, 2006). A person's self-improvement can be improved using self-assessment through experiences, situations, or past events, by reflecting oneself through attitudes and beliefs in a way of assessing abilities, importance, and success, which ultimately lead to self-worth (Fu, Hase, Goolamallee, Godwin, & Freeman, 2021).

As mentioned above, the effect of using metaverse technology together with role-playing and reflection for self-improvement has filled in the knowledge gaps of previous research to enhance self-esteem among adolescents.

Research Objectives

1. To study conditions, needs, and self-esteem of adolescent.

2. To study the components of metaverse technology that employs Role-playing in Self-reflection to promote self-esteem among adolescents.

3. To validate the consistency of metaverse technology that employs role-playing in self-reflection to promote self-esteem among adolescents and the empirical data.

Research Hypothesis

Metaverse technology that employs role-playing in self-reflection to promote self-esteem among adolescents fit with the empirical data.

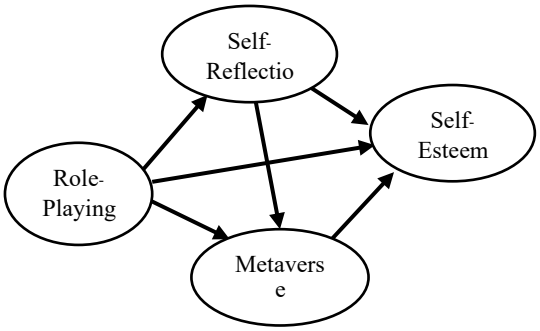

Figure 1 Conceptual framework of metaverse technology that employs role-playing in self-reflection to promote self-esteem among adolescents

Literature Review

Metaverse is the combination of the word 'Meta' and 'Verse' which means "the universe beyond imagination". They work together boundlessly as a learning system analyzing devices and leading to the future true sharing (Sin-nosuke Suzuki et al., 2020). Metaverse referring to Second Life's concept (founded by Philip Rosedale, 2007) is the virtual world where people can express themselves in the online platform as parallel space to the actual world (Haihan Duan, 2021). With the emerging of metaverse technology, the physical interactions with the minimization of race, gender, and disability consideration are allowed, which will be highly beneficial for a community, especially for the self-esteem of its members. Moreover, when such findings are employed in educational context, the inter-personal communication can be changed, bringing tremendous attention around the globe to metaverse technology. Simultaneously, the metaverse community is expected to align with the 'Second Life' virtual world concept in which the direct and physical interactions are explored in order to be connected with others both in the virtual and real world.

Role-playing is a form of communication by consciously or unconsciously mimicking a behavior of others (Taylor, 2018). The alteration in self-behavior to respond to a social role or gain acceptance is also included (Leah & Henrik, 2020). Role-playing is also a training which the performer can literally experience in the hypothetical situation where the experiment and learning for self adaptation in different circumstances are effectively conducted (Alexander & LeBaron, 2012;

Arrighi, Irvine, Joyce, & Haracz, 2018). Furthermore, the expressions in the pre-defined roles will disclose emotions and attitudes of the performers toward the situation or behavior and encourage the understanding of other related characters' behaviors in the scene (Truscheit & Otte, 2004; Sujira GawKeaw, 1991). In other words, adopting role-playing in education facilitates the lessons of empathy through the assigned roles (Alabsi, 2016; Truscheit & Otte, 2004). It is also a tool that can provide deep comprehension in a topic studied (Alzboun, Smadi, & Baniabdelrahman, 2017).

Self-reflection is the process which an individual utilizes for change and decision making. Self-reflection can alter hypotheses and adapt existing knowledge to a new paradigm or establish new set of wisdom according to the dynamic of a situation. There are two concepts of self-reflection which are inter-related: reflection-in-action and reflection-on-action (Mezirow, 1994, Copeland, et al., 1993, Schon, 1983; Robinson, 1997). Self-reflection is also a meaning-making process that pushes an individual from an experience to a deeper understanding of the relation among the circumstance and other situations, including other notions which can induce the chain of learning and solidify the cognition process to positively affect the individual and society.

Self-esteem is pride or self-value recognition translating into the optimistic view of the person, including self-respect, acceptance, and belief. It is also the confidence in one's own competence to achieve a goal with appreciation in oneself and others and being able to live with ambition (Buratin, 2020, Smedema et al., 2015, Gothe, Erlenbach, & Engels, 2021, Boo-Gil & Hyun-Suk, 2021, Wang & Wu, 2019, Kielkiewicz, Mathúna, & McLaughlin, 2020, Raevuori et al., 2007). The two components of self-esteem are defined as personal internal and external factors (Buratin, 2020) as follows.

1. Internal factors are internal characteristics

    1.1 Competency reflects the outstanding characteristics of a person to be recognized by others, affecting self-esteem and self-distrust.

    1.2 Emotional state resonates contentment, happiness, or anxiety from interactions with others leading to self-evaluation.

    1.3 Physical conditions can influence a person both positively and negatively as an appearance perceived by others and a distinctive quality defined and appreciated by the change and value of the period of time.

    1.4 Expectation is a self-evaluation from the comparison between the quality of deliverables and personal

standards, impacting anticipation and disappointment of a person.

1.5 Personal value is to compare personal view with the social view. If the value is inconsistent with the society, it may decrease one's self-esteem.

1.6 Gender is considered as society tends to view male positively.

1.7 Problems and Pathology can cause low self-esteem expressed as more anxiety and distress.

2. External factors are the surrounding conditions influencing one's self-esteem

2.1 Relationship with family is a significant factor reflecting the closeness and affection among family members.

2.2 Educational institution is a space where self-expression is allowed at highest level and play a crucial role in self-esteem formation second to family.

2.3 Social status reflects the status of a person in a society with the pride in relation with the level of acceptance from others.

2.4 Friends is the circle of relation in which an individual evaluates and compares oneself to peers e.g. capability and proficiency.

Research Method

This research is quantitative research. The purpose of the study was to study conditions and needs. This is a study of the opinions of adolescents aged 15-18 years, considering the sample size by using the sample size determination according to the research objectives. Therefore, the sample group used in the research was set at 10 subjects per parameter for use in the composition analysis, with a sample of not less than 400 people asking for information as follows: (1) Preliminary information of adolescent, (2) The condition of need for self-esteem using the Need Solution and Need Identification process by analyzing the data from the sample group using the Modified Priority, Needs Index (PNI Modified) formula. The questionnaires received 550 responses. Then, 442 complete questionnaires were selected for analysis to verify the validity of the model and the study of influence between variables in the SEM (Structural Equation Modeling Analysis).

Results

The order of the needs for self-esteem in adolescents are as follows.

Table 1 Needs for self-esteem in adolescents

Self-esteem		Current	Goal	Need	Order
1	I'm proud of my own ability	3.760	4.389	0.167	5
2	I can manage and control my own emotion properly in different circumstances with positive consequences	3.851	4.413	0.146	7
3	I respect myself, so I am assertive	3.741	4.357	0.164	6
4	I respect my own ability	3.837	4.378	0.141	9
5	I believe in my own expressions.	3.650	4.305	0.179	2
6	I live with my life's goal.	3.814	4.483	0.175	3
7	I think and evaluate my own ability.	3.828	4.378	0.144	8
8	I am able to rely on my ability to achieve my goals.	3.790	4.480	0.182	1
9	I behave nicely as I have been taught by adults.	4.030	4.350	0.079	15
10	I have good feeling about how I behave.	4.049	4.457	0.101	13
11	I follow good role models and behave accordingly.	4.068	4.387	0.079	14
12	I am contented with my potential and ability.	3.774	4.417	0.170	4
13	I can express myself properly in public environment.	3.939	4.441	0.127	11
14	I improve myself to a good role model in social expression.	3.834	4.338	0.131	10
15	I realize and appreciate my own value and ability.	3.960	4.415	0.115	12

In the data analysis of the adolescent self-esteem model with metaverse technology that uses role-playing in self-reflection, there were 4 latent variables: self-esteem (SEST), role-playing (ROPL), metaverse technology (METAV), and reflection (REFL) with 17 observed variables used in the data analysis.

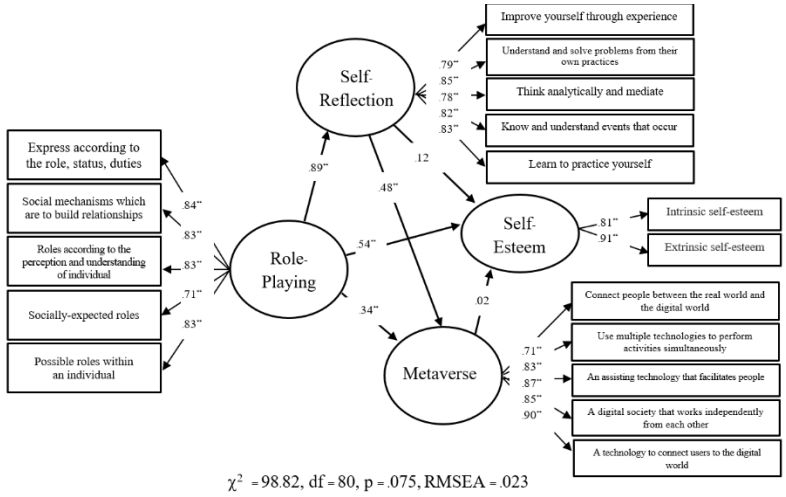

Figure 2 The model of self-esteem of adolescent with metaverse technology that uses role-playing in reflection

For the consistency test of the adolescent self-esteem model with metaverse technology using role-playing in reflection, the results of the first analysis revealed that the model was inconsistent with the empirical data. Based on the chi-square value, it is 571.96 at 113 degrees of freedom and probability (p) is .000. With the analysis result, the researcher allowed correlated error by relieving preliminary assumption in the original statistics which indicated that there was no correlation in error. The redefined assumptions for SEM were to analyze error term and to allow error term to be correlated as the reality of natural phenomenon. The result of the model modification showed more accurate effect size and correlation between variables in the model (Joreskog and Sorbom, 2004). The modification indices were considered for the modification, including the 33 paths of the model. The paths were 1) Theta-Delta (TD), 2) Thera-Epslion (TE), and 3) Theta-Delta-Epsilon (TH). After the model modification, the model of the adolescent self-esteem model with metaverse technology using role-playing in reflection was fit with empirical data with the results shown in Table 2.

Table 2 Results of statistics analysis of correlation coefficient between latent variables and effect size analysis

Variables	REFL			METAV			SEST		
	TE	IE	DE	TE	IE	DE	TE	IE	DE
ROPL	.886**	-	.886**	769**	.428**	.341**	.654**	.117	.537**
	(.053)	-	(.053)	(.057)	(.081)	(.086)	(.057)	(.103)	(.120)

REFL	-	-	-	.484**	-	.484**	.125	.008	.117
	-	-	-	(.090)	-	(.090)	(.114)	(.037)	(.121)
METAV	-	-	-	-	-	-	.017	-	.017
	-	-	-	-	-	-	(.076)	-	(.076)
Statistics	Chi-square =98.82, df = 80, p = .075, GFI = .97, AGFI = .95, RMR = .023								
Variable	ro1	ro2	ro3	ro4	ro5	me1	me2	me3	me4
Reliability	.714	.685	.695	.508	.686	.510	.686	.762	.727
Variable	me5	re1	re2	re3	re4	re5	ses1	ses2	
Reliability	.810	.625	.717	.612	.670	.689	.658	.825	

Squared Multiple Correlations for Structural Equations

	METAV	**REFL**	**SEST**
R SQUARE	.642	.785	.431

Correlation matrix between latent variables

Latent variable	**METAV**	**REFL**	**SEST**	**ROPL**
METAV	1.000			
REFL	.785	1.000		
SEST	.522	.606	1.000	
ROPL	.769	.886	.654	1.000

Remark: The number in the parentheses is the standard error, **p < .01

TE = Total Effect, IE = Indirect Effect, DE = Direct Effect

Based on the analysis of the self-esteem of adolescent with metaverse technology that uses role-playing in reflection model, the model was consistent with the empirical data by considering the chi-square which was 98.82 at 80 degrees of freedom degree and p-value was 0.75. The chi-square was different from 'zero' with no significance. The result indicated that the model of self-esteem of adolescent with metaverse technology that uses role-playing in reflection was fit with the empirical data, supported by GFI = 0.97 and AGFI = 0.95 (close to one), RMR = 0.21 (close to zero) and the Largest Standardized Residuals = 2.25.

Considering reliability, the observed variables possessed the reliability between 0.508 to 0.825. The variable with the highest reliability was

extrinsic self-esteem (ses2) at 0.825, followed by a technology to connect users to the digital world (me5) at 0.810 and an assisting technology that facilitates people (me3) at 0.762. The variable with the lowest reliability was socially-expected roles (ro4) at 0.508. Overall, all the reliabilities of the observed variables were high except for socially-expected roles (ro4) and connect people between the real world and the digital world (me1) that were moderately reliable.

In terms of R-SQUARE of the structural endogenous latent variable model, reflection (REFL) had R-SQUARE 0.785 meaning that the role-playing (ROPL) could explain the variation of reflection (REFL) by 78.50%. Simultaneously, the R-SQUARE of metaverse technology (METAV) was 0.642, in other words, role-playing (ROPL) and reflection (REFL) can be explained variance of metaverse technology (METAV) by 64.20%. Lastly, the R-SQUARE of self-esteem (SEST) was 0.431 as role-playing (ROPL), reflection (REFL), and metaverse technology (METAV) could be explained variance of self-esteem (SEST) by 43.10%.

Interpreting the correlation matrix between latent variables, correlation coefficients ranged between latent variables were between 0.552 to 0.886 as all pairs of variables had the same correlated. The highest correlation coefficient was 0.886 for role-playing (ROPL) and reflection (REFL) with the more role-playing, the more reflection. The second ranking was reflection (REFL) and metaverse technology (METAV) with the high level of the correlation coefficient at 0.785.

The next point to be considered is the direct and indirect effect. The correlation between role-playing (ROPL) and metaverse technology (METAV) (the effect size is 0.769) could be divided into direct effect = 0.341, indirect effect = 0.428, and total effect = 0.769 and they were statistically significant. It was noticeable that the indirect effect of role-playing (ROPL) toward metaverse technology (METAV) was higher than the direct effect, which could mean that role-playing (ROPL) affected metaverse technology (METAV) directly with reflection (REFL) as the mediator facilitated the effective use of metaverse technology (METAV) in role-playing development. Meanwhile, the correlation between role-playing (ROPL) and self-esteem (SEST) (the effect size is 0.654) could be defined as direct effect = 0.537, indirect effect = 0.117, and total effect = 0.654 with only direct effect and total effect that were statistically significant. Another considerable point was that the direct effect of role-playing (ROPL) toward self-esteem (SEST) was higher than the indirect effect which indicated that role-playing (ROPL) impacted self-esteem (SEST) with reflection (REFL) and metaverse technology (METAV) as supporting elements in the self-esteem of adolescent.

Conclusion

Self-esteem model of adolescent with metaverse technology that employs role-playing in self-reflection was a causal relationship model

that consists of variables, comprising one exogenous latent variable, namely role-playing, and three endogenous latent variable which are metaverse technology, reflection and self-esteem. The results of examining the validity of the self-esteem model of adolescents with metaverse technology that employs role-playing in self-reflection found that the model was consistent with the empirical data.When considering the forecast coefficient, it was found that the role-playing and reflection were able to highly explain the variables of the metaverse technology while role-playing variables, reflection and metaverse technology were able to explain self-esteem variables at a moderate level. It is worth noting that self-esteem in adolescents can still be influenced by other variables which can be studied further.

Recommendations

1. Recommendation for application

1.1 The findings from the research indicated that self-esteem in adolescents needs to be learnt through role-playing and reflection. Hence, to study acting effectively, there should be an emphasis on the role-playing and reflection to raise self-esteem in adolescents.

1.2 Based on the study result, as role-playing and reflection could highly explain metaverse technology Therefore, metaverse technology should be employed in learning activity together with role-playing and reflection which are the crucial components for the effective learning activity design.

1.3 Another interesting conclusion is that role-playing (ROPL) affect metaverse technology (METAV) directly with the mediator. Consequently, reflection activity should be encouraged to stimulate learners for the attention in acting study through metaverse platform.

2. Recommendation for further study

2.1 The study showed that self-esteem in adolescents from the influence of role-playing, reflection, and metaverse technology was at moderate level; so, other factors related to acting class to leverage self-esteem should be further studied.

2.2 In this study, the structural equation model was analyzed and found that reflection is the mediator between role-playing and metaverse technology. As a result, the further study should be designed quasi-experimental research which employs reflection as a learning activity before expressing by role-playing on metaverse platform and compare the result before and after the experiment.

2.3 This model can be a prototype model for experimental research design in class or other quantitative studies and the researcher may gather data for model analyzing based on the actual educational context.

REFERENCES

1. Adams, J. D., & Mabusela, M. S. (2013). Employing role-play in teaching and learning: A case of higher education. *South African Journal of Higher Education,* 27(3), 489-500. Retrieved from https://chula.idm.oclc.org/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=eue&AN=109995453&site=eds-live
2. Alabsi, T. A. (2016). The Effectiveness of Role Play Strategy in Teaching Vocabulary. *Theory & Practice in Language Studies,* 6(2), 227-234. doi:10.17507/tpls.0602.02
3. Alexander, N., & LeBaron, M. (2012). Dancing to the Rhythm of the Role-Play, Applying Dance Intelligence to Conflict Resolution. *Hamline Journal of Public Law & Policy,* 33(2), 327-362. Retrieved from https://chula.idm.oclc.org/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=lgs&AN=86175275&site=eds-live
4. Alzboun, B. K., Smadi, O. M., & Baniabdelrahman, A. (2017). The Effect of Role Play Strategy on Jordanian EFL Tenth Grade Student's Speaking Skill. *Arab World English Journal,* 8(4), 121-136. doi:10.24093/awej/vol8no4.8
5. Andreea-Maria, H., Larisa-Andreea, T., & Iasmina, I. (2020). NON-VERBAL COMMUNICATION IN THE ONLINE ENVIRONMENT. *Agricultural Management / Lucrari Stiintifice Seria I, Management Agricol,* 22(3), 33-36.
6. Ari, T., & Munassar, O. (2020). Two Stages of Turkey's Quest for a Regional Power Status in the Middle East: An Integrated Role-Status-seeking Approach. Türkiye'nin Orta Doğu'da Bölgesel Güç Statüsü Arayışındaki İki Aşama: Bütünleşik Rol-Statü Arayışı Yaklaşımı., 14(27), 331-359. Retrieved from https://chula.idm.oclc.org/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=asn&AN=147904566&site=eds-live
7. Arrighi, G., Irvine, C., Joyce, B., & Haracz, K. (2018). Reimagining 'role' and 'character': An approach to acting training for role-play simulation in the tertiary education setting. *Applied Theatre Research,* 6(2), 89-106. doi:10.1386/atr.6.2.89_1
8. Athanasios, D., & Maria, K. (2019). Attention and its Role: Theories and Models. *International Journal of Emerging Technologies in Learning (iJET),* 14(12), 169-182. doi:10.3991/ijet.v14i12.10185
9. Boo-Gil, S., & Hyun-Suk, P. (2021). The Relationships between body image, self-esteem, and future consumption behaviors of college students participating in sports. *Ilkogretim Online, 20*(3), 681-686. doi:10.17051/ilkonline.2021.03.70
10. Buratin, K. (2020). The relationship between paternal education, self-esteem, resilience, future orientation, and career aspirations. *PLoS ONE, 15*(12), e0243283-e0243283. doi:10.1371/journal.pone.0243283
11. Cheville, R. A. (2016). Linking capabilities to functionings: adapting narrative forms from role-playing games to education. *Higher Education,* 71(6), 805-818. Retrieved from

https://chula.idm.oclc.org/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.24757015&site=eds-live

12. Chonticha Bumrungrak. (2018). Nonverbal Messages in Thai Short Stories; Sarn-rai-toi-kum-nai-rueng-sun-thai (non-verbal communication in Thai short story). *Language and Linguistics*; Vol 35 No 1 (2016): July-December; 1-22.
13. Fu, D., Hase, A., Goolamallee, M., Godwin, G., & Freeman, P. (2021). The effects of support (in)adequacy on self-confidence and performance: Two experimental studies. *Sport, Exercise, and Performance Psychology,* 10(1), 15-26. doi:10.1037/spy0000206
14. Gothe, N. P., Erlenbach, E., & Engels, H.-J. (2021). Exercise and self-esteem model: Validity in a sample of healthy female adolescents. *Current Psychology ; ISSN 1046-1310 1936-4733*. doi:10.1007/s12144-021-01390-7 10.1007/s12144-021-01390-7.pdf 10.1007/s12144-021-01390-7/fulltext.html
15. Kelly, M., Nixon, L., Broadfoot, K., Hofmeister, M., & Dornan, T. (2019). Drama to promote non-verbal communication skills. *Clinical Teacher,* 16(2), 108-113.
16. Kielkiewicz, K., Mathúna, C. Ó., & McLaughlin, C. (2020). Construct Validity and Dimensionality of the Rosenberg Self-Esteem Scale and Its Association with Spiritual Values Within Irish Population. *Journal of religion and health, 59*(1), 381-398. doi:10.1007/s10943-019-00821-x
17. Leah, O.-E., & Henrik, E. (2020). Lessons Learned from Teaching Nursing Students about Equality, Equity, Human Rights, and Forced Migration through Roleplay in an Inclusive Classroom. *Sustainability,* 12(7008), 7008-7008. doi:10.3390/su12177008
18. Maslow, A. H. (1970). *Motivation and Personality.* (2nd ed.). New York : Harper&Row.
19. Niblett, B., Hiscott, K., Power, M., & McFarlane, H. (2020). Partnering for Outdoor Play: A Case Study of Forest and Nature School Programming in the Context of Licensed Child Care in Ottawa, Ontario. *Canadian Journal of Environmental Education,* 23(2), 67-85. Retrieved from https://chula.idm.oclc.org/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=edo&AN=146862897&site=eds-live
20. Okun, O., Arun, K., & Begec, S. (2020). INTRAPRENEURSHIP AND EXPECTATIONS RESTRICTIONS. *EL INTRAEMPRENDIMIENTO Y LAS RESTRICCIONES DE EXPECTATIVAS.,* 18(2), 53-61. doi:10.15665/dem.v18i2.2181
21. Pelletier, M. J., & Hopkins, K. H. (2018). Intercollegiate Role-Play: Creating a Sense of Reality and Uncertainty in the Sales Classroom. *Journal for Advancement of Marketing Education,* 26, 25-30. Retrieved from https://chula.idm.oclc.org/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=132104309&site=eds-live
22. Pozzoli, T., & Gini, G. (2021). Longitudinal Relations between Students' Social Status and Their Roles in Bullying: The Mediating Role of Self-

Perceived Social Status. *Journal of School Violence,* 20(1), 76-88. Retrieved from https://chula.idm.oclc.org/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=edshol&AN=edshol.hein.journals.wjsv20.8&site=eds-live

23. Raevuori, A., Keski-Rahkonen, A., Kaprio, J., Silventoinen, K., Dick, D. M., Rissanen, A., Viken, R. J. (2007). Genetic and environmental factors affecting self-esteem from age 14 to 17: A longitudinal study of Finnish twins. *Psychological Medicine, 37*(11), 1625-1633. doi:10.1017/S0033291707000840
24. Smedema, S. M., Fong, C., Yaghmaian, R. A., Cardoso, E. D., Muller, V., Keegan, J., Ebener, D. J. (2015). The Relationship of Core Self-Evaluations and Life Satisfaction in College Students with Disabilities: Evaluation of a Mediator Model. *Journal of Postsecondary Education & Disability, 28*(3), 341-358. Retrieved from https://chula.idm.oclc.org/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=eue&AN=112811454&site=eds-live
25. Sujitra Gawkeaw. (1991). The comparison of generous behaviors in elementary students who are able to role play between different thoughts while being observed and no observer. In: Chulalongkorn University.
26. Taylor, V. F. (2018). Afraid of the Deep: Reflections and Analysis of a Role-Play Exercise Gone Wrong. *Journal of Management Education*, 42(6), 772-782.
27. Truscheit, A., & Otte, C. (2004). Sustainable Games People Play: Teaching Sustainability Skills with the Aid of the Role-play 'NordWestPower'. *Greener Management International.* (48), 51-56. Retrieved from https://chula.idm.oclc.org/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.greemanainte.48.51&site=eds-live
28. Wang, J., & Wu, Y. (2019). Self-esteem modulates the ERP processing of emotional intensity in happy and angry faces. *PLoS ONE, 14*(6), 1-15. doi:10.1371/journal.pone.0217844