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The Saltomachy War – A Metaverse Escape Room on the War Against Salt

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The Cyberpharm Futurist

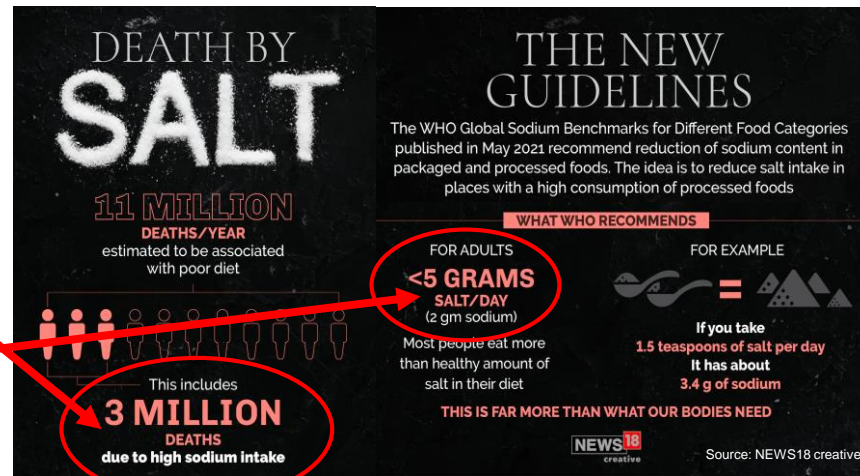
*CME: Certified Metaverse Expert™





Background to the Problem

- Excessive salt intake is a risk factor of cardiovascular disease (CVD): [1,2]
 - Predisposes to hypertension, heart attack, stroke, etc
- CVD is a leading cause of death globally
 - Reduced salt consumption can reduce CVD risk
- FDA & WHO released guidance on healthy sodium intake [2-5]
- Public education can help consumers make better informed choices
 - Levels of salt in foods, Healthy eating habits, How to maintain a healthy lifestyle

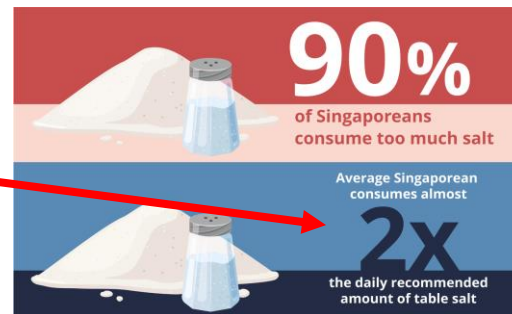


- Chen X. et al. Nutr Metab Cardiovasc Dis 2021; 31(12): 3314-21.
- World Health Organization. Key facts: Salt reduction. Apr 2022.
- World Health Organization. News release: New WHO benchmarks help countries reduce salt intake and saves lives. May 2021.
- US FDA. Sodium reduction. Oct 2021.
- US FDA. Guidance document: Guidance for industry: Voluntary sodium reduction goals. Oct 2021.



War Against Salt

- In SG, changes in eating patterns – more people eating out/ ordering deliveries ^[1]
- MDH launched a nationwide “War on Salt” campaign in Oct 2022: ^[1-3]
 - Replace regular salt with alternatives (e.g. K-salt, MSG)
 - Lower sodium sauces & seasonings
 - Working with:
 - Suppliers → Offer affordable lower-sodium salts to food operators
 - Food operators → Switch to healthier alternatives in cooking



1) Chong C. Budget debate: Moves to decrease salt intake, substitute with lower-sodium alternatives. The Straits Times. 9 Mar 2022.
2) Ministry of Health Singapore. MDH presents: The Great A-Salt. YouTube video. 17 Jan 2023.
3) MDH's Guardian of Health battles salty villains in new action-packed short film. Petir. 27 Jan 2023.



Research Question

- With increasing popularity of escape rooms & hype about the metaverse:
 - Can a metaverse escape room be used for healthcare education among the younger generations of learners?
- **Objectives:**
 - To identify the usefulness of an in-house developed metaverse escape room for increasing public awareness on the War Against Salt
 - Is the metaverse escape room an attractive platform among younger learners?
 - Can the metaverse escape room improve public awareness of health-related issues?



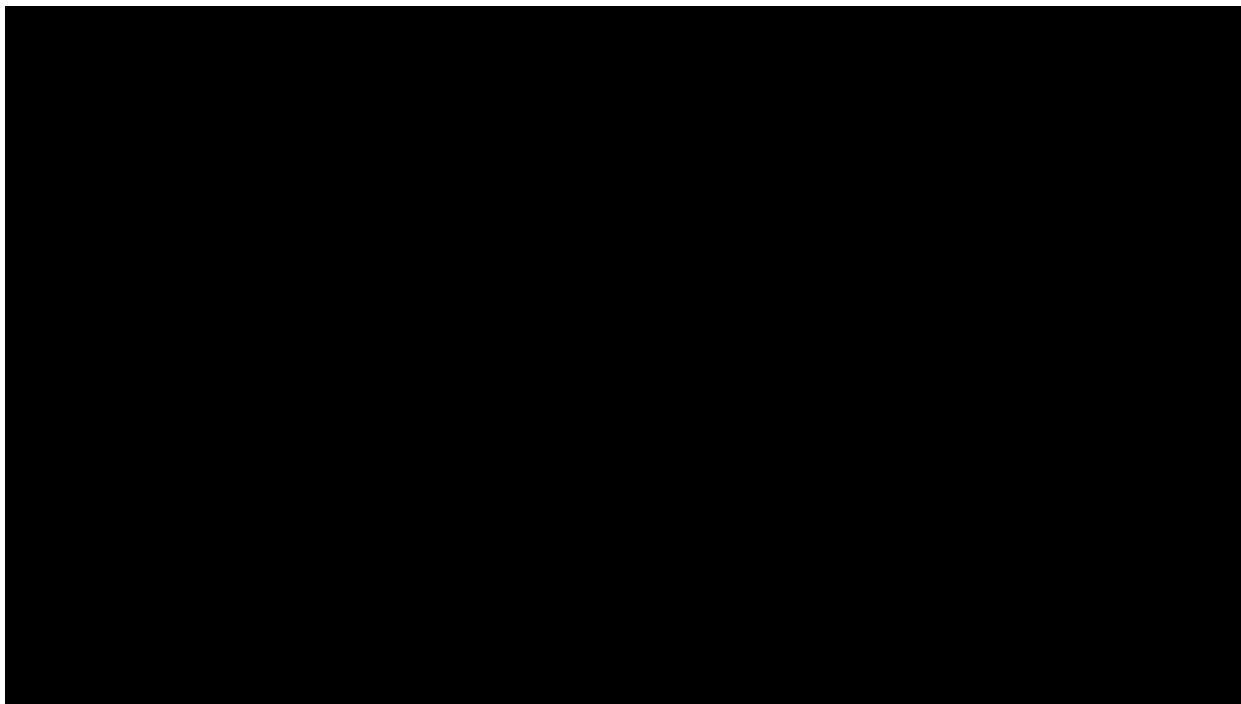
Methods: The Saltomachy War (TSW) – Development

- TSW designed & developed on a metaverse event platform
- Consists of “worlds” where players find facts/clues, solve puzzles related to War Against Salt
- Learners play as avatars in teams of 4 to 5
- Interact with 2D/3D artifacts & other avatars in real-time
- Learners document their answers to puzzles in Google Forms





Methods: The Saltomachy War (TSW) – Trailer



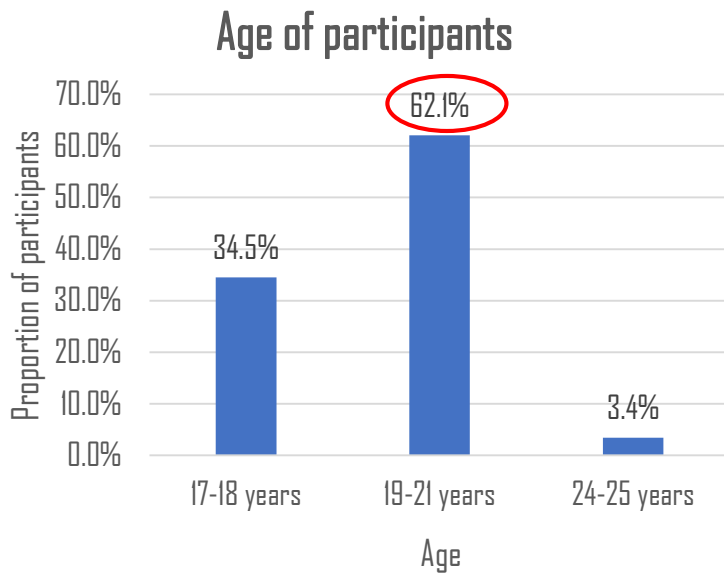


Methods: The Saltomachy War (TSW) – Pilot Study

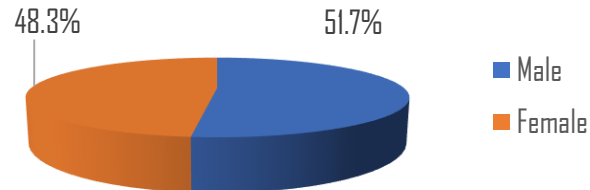
- 29 students from a local polytechnic participated via convenience sampling (end Aug – mid-Sep 2022)
- Pre-game & post-game knowledge quiz → 15 MCQs:
 - Risks, signs & symptoms of excessive salt intake
 - Ways to reduce salt consumption
 - Ways to maintain a healthy diet & lifestyle
 - Local government initiatives in SG to increase public awareness on War Against Salt
- User experience survey:
 - 14 statements on understandability of content, usefulness, ease-of-use & satisfaction with gameplay
 - 5-point agreement scale



Results: Demographics (N=29)



Gender of participants



Academic School



- School of Applied Science
- School of Informatics and IT

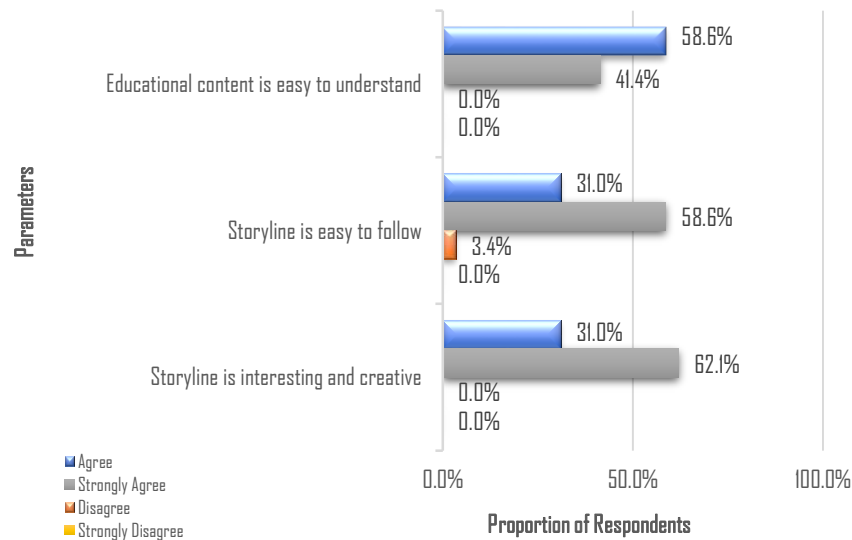


Results: TSW – Experience

Questions / Parameters	Mean ± SD
• Educational content is easy to understand	4.41 ± 0.50
• Storyline is easy to follow	4.45 ± 0.78
• Storyline is interesting and creative	4.55 ± 0.63

- Majority agreed / strongly agreed that their TSW experience was positive

Participants' Experience with TSW (N=29)



* Some respondents indicated "Neither Agree nor Disagree"

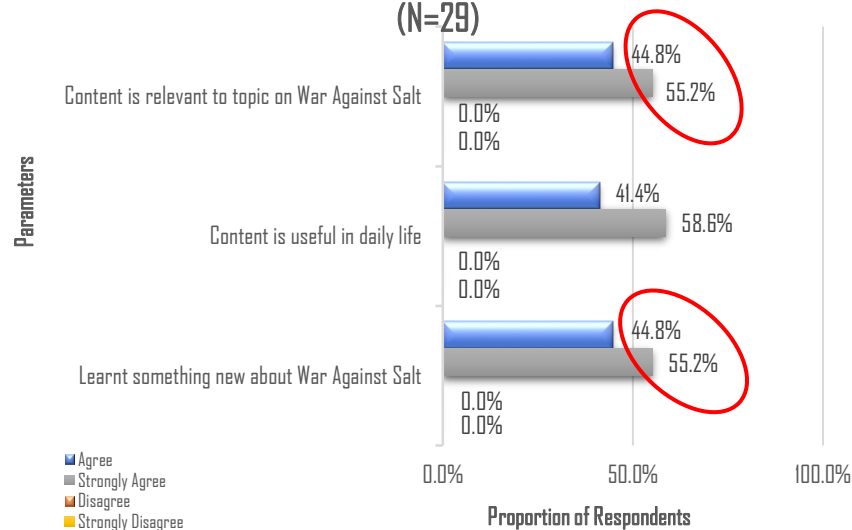


Results: TSW – Usefulness of Content

Questions / Parameters	Mean ± SD
• Content is relevant to topic on War Against Salt *	4.55 ± 0.51
• Content is useful in daily life	4.59 ± 0.50
• Learnt something new about War Against Salt *	4.55 ± 0.51

- All agreed that TSW content was useful
- Respondents from SAS were more likely than SIIT to:
 - Find the content relevant to the topic on War Against Salt. (p=0.042)
 - Learn something new about War Against Salt (p=0.042)

Participants' Perceptions on Usefulness of TSW Content (N=29)



* Some respondents indicated "Neither Agree nor Disagree"

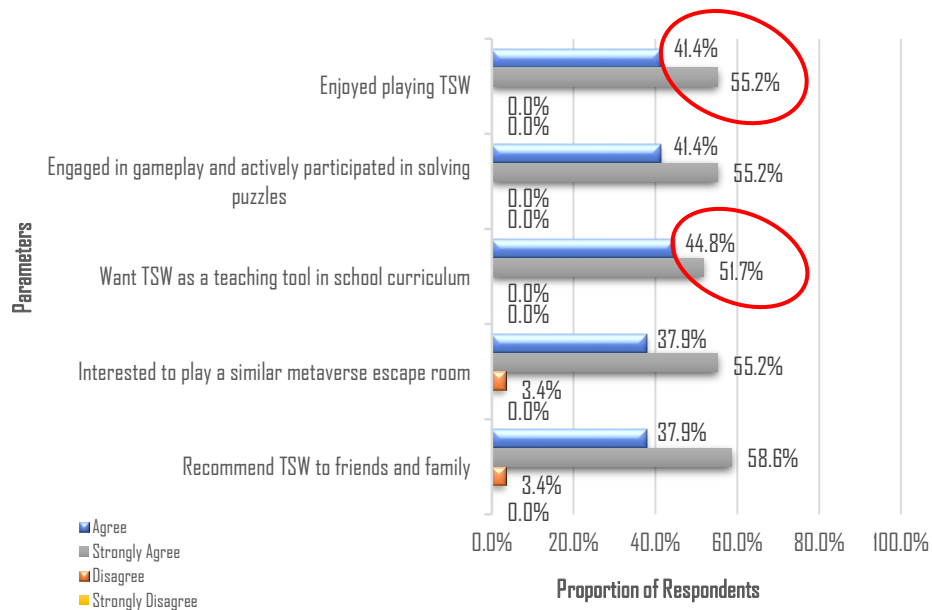


Results: TSW – Satisfaction

Questions / Parameters	Mean ± SD
• Enjoyed playing TSW*	4.52 ± 0.57
• Engaged in gameplay and actively participated in solving puzzles	4.52 ± 0.57
• Want TSW as a teaching tool in school curriculum*	4.48 ± 0.57
• Interested to play a similar metaverse escape room	4.45 ± 0.74
• Recommend TSW to friends and family	4.52 ± 0.69

- Majority were satisfied with the TSW game
- Respondents from SAS were more likely than SIIT to:
 - Enjoy playing TSW ($p=0.022$)
 - Want TSW to be implemented as a teaching tool in school curriculum ($p=0.003$)

Participants' Satisfaction with TSW (N=29)



* Some respondents indicated "Neither Agree nor Disagree"



Results: Knowledge Assessment (N=29)

		Pre-quiz		Post-quiz		
		Median scores (IQR)	P-values bet gps ^a	Median scores (IQR)	P-values bet gps ^a	P-values bet pre- & post-quiz scores ^b
Gender:	Males	8.0 (5.0 – 9.0)	0.278	10.0 (9.0 – 13.0)	0.038*	0.005*
	Females	9.0 (7.0 – 10.3)		13.0 (11.8 – 13.3)		0.002*
Academic School:	Applied Science	9.0 (8.0 – 11.0)	0.004*	13.0 (12.0 – 14.0)	<0.001*	0.001*
	Informatics & IT	7.5 (4.8 – 9.0)		10.0 (8.8 – 11.0)		0.008*
Year of Study:	Year 2	5.0 (5.0 – 8.0)	0.009*	10.0 (9.0 – 12.0)	0.226	0.017*
	Year 3	9.0 (8.0 – 10.0)		13.0 (9.5 – 13.5)		<0.001*
All participants		9.0 (7.0 – 9.5)	-----	12.0 (9.5 – 13.0)		<0.001*

Females scored sig better in post-quiz compared to males

SAS students scored sig better in pre- & post-quizzes compared to SIIT students

Sig increase in post-quiz scores compared to pre-quiz scores

^a Mann-Whitney test ^b Wilcoxon signed-rank test



Conclusion

- In general, participants felt that TSW escape room was:
 - ✓ Interesting & creative, with an easy-to-follow storyline
 - ✓ Fun, engaging & enjoyable
 - ✓ Able to increase public awareness on health promotion initiatives (e.g. War Against Salt)
- Majority are willing to explore the Metaverse in the future for their education & learning



Acknowledgements & Other Presentations

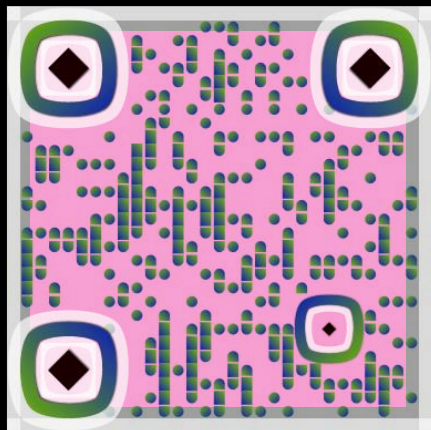
- Department of Pharmacy, Singapore General Hospital
 - Petrina Fan
 - Shakunthala D/D Hans Raj
- Final Year Project students from School of Applied Science, Temasek Polytechnic:
 - Arasyulhaq Bin Ahmad
 - Serene Tan
 - Muhammad Afiq Nadhir B Sahri
 - Junqin Chen

An in-house developed probiotics database e-reference information for healthcare professionals
(Mr Adison Goh)

SESSION 301: Information and knowledge management
Monday, Jul 10, 2023
12:00 PM – 12.10 PM
Room C4.1

Developing a digital health metacademy for continuing professional education

Digital posters - Human, organisational and social aspects
Tuesday, Jul 11, 2023
12:15 PM – 1:45 PM
Innovation Expo



~ Thank You ~

If you are interested in collaborating, please contact me:

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