UTS

A device looking for a purpose and user-centred co-design: 3D food printing not yet delivering on expectations of benefit for people with swallowing disability.

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6th FOOD DRYING INTERNATIONAL CONFERENCE (FDIC 2020)

7th SYMPOSIUM FOR SPACE NUTRITION AND FOOD ENGINEERING, **WUXI, CHINA**

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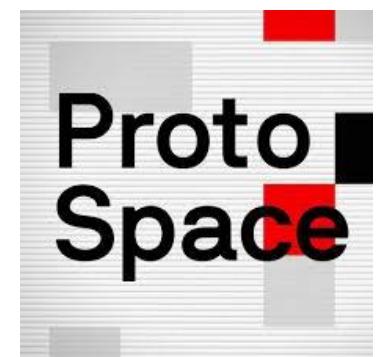
Proto Space

Acknowledgements

- NHMRC Equipment Grant (to purchase the Foodini, by Natural Machines)

- ARC Discovery Grant 2020-2022

- ProtoSpace 3D Printing Lab UTS

Background

- Estimates suggest that up to 8% of the world's population have swallowing disability

- Many will need texture-modified foods. Some will need pureed foods

- The presentation of puree foods is problematic and could be improved using a range of strategies.

- These strategies include food piping bags, food moulds, and 3D food printing of puree foods.

The IDDSI Framework

Providing a common terminology for describing food textures and drink thicknesses to improve safety for individuals with swallowing difficulties.

FOODS

- TRANSITIONAL FOODS
- REGULAR — 7
- EASY TO CHEW
- SOFT & BITE-SIZED — 6
- MINCED & MOIST — 5
- PUREED — 4 — EXTREMELY THICK
- LIQUIDISED — 3 — MODERATELY THICK
- 2 — MILDLY THICK
- 1 — SLIGHTLY THICK
- 0 — THIN

DRINKS
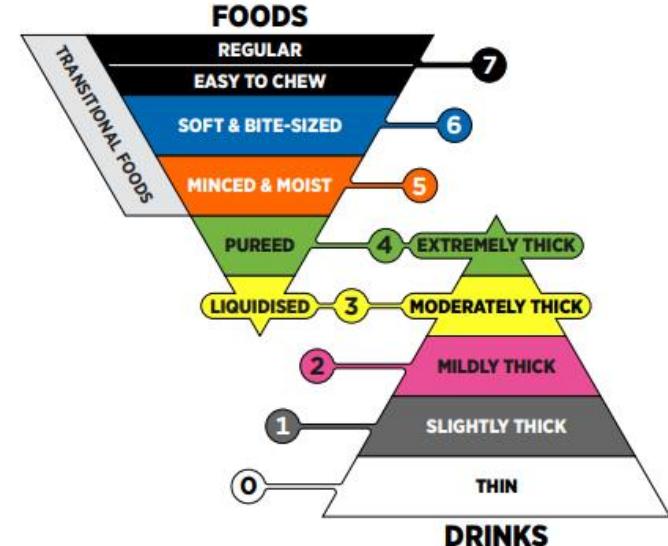
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Derivative works extending beyond language translation are NOT PERMITTED.

Most foods currently printed are either standard texture (chocolate, biscuits) or pureed food (IDDSI Level 4).

Method

16 expert users across 11 disciplines had an 'immersion' experience in using a domestic scale 3D food printer in a research setting at ProtoSpace UTS.

In 5 groups, they created puree food shapes, tasted the food printed, and discussed their impressions and ways that the printer might be used for people with swallowing disability.
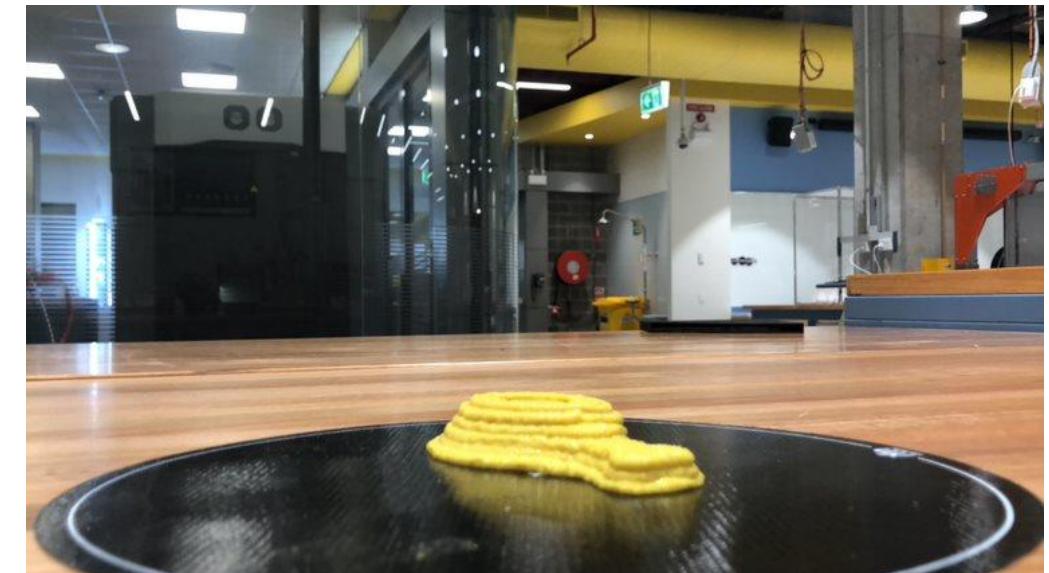
16 expert participants (11 disciplines) in 5 visits

3 speech pathologists	2 business managers	1 marketing and business	1 dietitian
1 manager disability services	1 direct support worker	1 public health	1 chef
1 computer scientist	1 engineer (human computer interaction)	1 chef/quality & safety officer	1 chef/catering manager
	1 person with swallowing disability		

Immersion in a 3D food printing experience

- Interviews were transcribed and de-identified before experts provided feedback on a content thematic analysis undertaken by the authors.

- Results are presented in terms of the themes identified across all 5 group discussions and transcripts of discussions during their immersion experiences.

- Overall, there were 6 themes and 12 sub-themes identified in the data.

Sub-Themes	Themes		Sub-themes
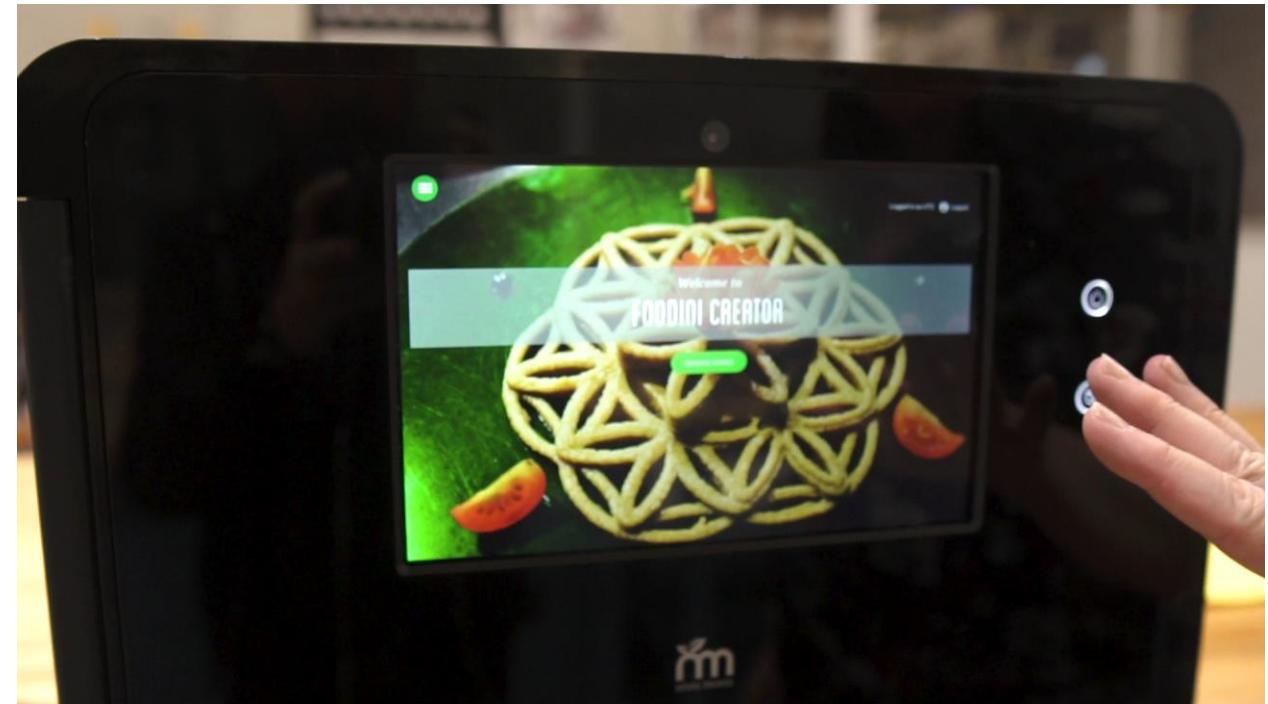
- *Fun to do, but not meeting expectations and being insubstantial*

First Impressions and Experiences of 3D Food Printing

Potential Applications of 3D Food Printing

- *Use in supported accommodation*
- *Use in improving nutrition*
- *Use as a novelty activity and improving choice and control.*

- *Filling the capsules*
- *Capsule parts and cleaning*
- *The printer interface*

Usability of the 3D Food Printer

Pre-processing of puree foods: Implications for using the 3D food printer

- *Shapes of 3D printed foods*
- *Diversity of food shapes and ingredients*
- *Filling printer capsules and pre-filled capsules*
- *Costs of the 3D food printer*
- *Recipes for 3D food printing*

Ideas for Improving 3D Food Printing Technologies

Printer safety, errors and the consequences

"I'm not quite sure of what I envisaged cos I've seen 3D printing before but with seeing it with food it was very fiddly and time consuming." G1P4

"It looks more like a dessert, a chocolate sort of thing. It doesn't look like you can create a meal." G1P2

"[people would be] frustrated because they wouldn't see what they were expecting" G1P1

"I think it's fantastic. This one I'm very proud of this." G2P9

Conclusions

The User Experience: Mind the Expectations Reality Gap

Bring the reality closer to the consumer

User-centred co-design is needed for an interactive device

A device that listens to and responds to the user: Human computer interaction

Puree food innovations are needed to assist the user in food cartridges

Enabling success and safe food production

Larger meals, detailed recipes, commercial supply

Program of "Transdisciplinary Tastes" research

SURVEY NOW OPEN: https://www.surveymonkey.com/r/3DfoodCafes

More than a meal, examining quality of life and food design for people with swallowing disability (Rebecca Smith, PhD Candidate, NHMRC Scholarship, UTS).

Views of café owners and restauranteurs on 3D Food Printing for people with swallowing difficulties (Sarah Orlovich Master of Speech Pathology student)

Designing a new user interface for 3D food printers to improve usability for dysphagia treatment (Elliot Jauregui, Bachelor of Engineering student capstone project)

Twitter discussion relating to 3D food printing: influencers and expectations

An Appetite for the Future

Examining the views of adults with swallowing disability, family members, health professionals, residential care workers, chefs, kitchen staff

Discovery Project 2020-2022

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