Like other forms of embodiment, pregnancy has increasingly become subject to representation and interpretation via digital technologies. Pregnancy and the unborn entities, the largely private and few people may have seen the foetal figures (Duden). However, foetal reproductions and unborn bodies become open to public portrayal and display (Lupton The Social Worlds of the Unborn). A plethora of online materials – websites depicting the unborn entity from the moment of conception, amateur YouTube videos of births, social media postings of ultrasounds and self-taken photos (‘selfies’) showing changes in pregnancy bellies, and so on – now ensure the documentation of pregnant and unborn bodies in extensive detail, rendering them open to other people’s scrutiny.

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We carried out a critical discourse analysis of these apps, looking closely at the app descriptions offered in the two stores. We adopted the perspective that sees apps as a form of embodiment, in the terms of a ‘ludic’ approach (Bogost) as ‘exploitationware’. Gamification has been described as ‘the use of game design elements in non-game contexts’ (Deterding et al. 9). The term originated in the digital media industry to describe the incorporation of features into digital technologies that not explicitly designed as games, such as competition, badges, rewards and fun that engaged and motivated users to make more enjoyable use of them. Gamification is now often used in literatures on marketing strategies, persuasive computing or behaviour modification. It is an important element of ‘nudge’, an approach to behaviour change that involves persuasion over coercion (Jones, Pykett and Whitehead).

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Gamification differs from ludification in that the former involves applying ludic principles for reasons other than the pleasures of enjoying the game for their own sake, often to achieve objectives set by actors and agencies other than the gamer. Indeed, this is why gamification software has been described by Bogost (Bogost) as ‘exploitationware’.

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days pregnant' with the users' photograph attached to the message. The woman's weight gain over time and a foetal kick counter are also included in this app. It provides various ways for users to mark the passage of time, observe the ways in which their foetuses change and move week by week and monitor changes in their bodies. According to the app description for 'My Pregnancy Today', using such features allows a pregnant woman to: 'Track your pregnancy day by day.' Other apps encourage women to track such aspects of physical activity, vitamin and fluid intake, diet, mood and symptoms. The capacity to visually document the pregnant user's body is also a feature of several apps. The 'Baby Bump Pregnancy', 'WebMD Pregnancy', 'I'm Expecting' and 'My Pregnancy Today' apps, for example, all offer an album feature for pregnant bump photos taken by the user of herself (described as a 'bumpie') in the blur for 'My Pregnancy Today'. 'Baby Buddy' encourages women to create a pregnancy avatar of themselves (looking glamorous, well-dressed and happy). Some apps even advise users on how they should 'feel' as a screenshot from 'Pregnancy Tracker Week by Week' claims: 'Victoria, your baby is growing in your body. You should be the happiest woman in the world.'

Just as pregnancy games for little girls portray pregnancy as a commodified and aestheticised experience, the apps directed at pregnant women themselves tend to shy away from discomforting fleshly realities of birth and birthing embodiment. Pregnancy is represented as an enjoyable and fashionable state of embodiment: albeit one that requires constant self-surveillance and vigilance.

**Hello Mommy?: The Personalisation and Aestheticisation of the Foetus**

A dominant feature of pregnancy-related apps is the representation of the foetus as already a communicative person in its own right. For example, the 'Pregnancy Tickers – Widget' app features the image of a foetus (looking far more like an infant, with a full head of wavy hair and open eyes) holding a card saying: 'hi baby' on the user's smartphone: 'Hello Mommy! When will I see you for the first time?' Several pregnancy-tracking apps also allow women to input the name that they have chosen for their expected baby, to receive customised notifications of its progress ('Justin is nine weeks and two days old today').

Many apps also incorporate images of foetuses that represent them as wondrous entities, adopting the visual style of 1960s foetal photography pioneer Lennart Nilsson, or what Stormer (Stormer) has referred to as 'prenatal sublimity'. The 'Pregnancy+' app features such images. Users can choose to view foetal development week-by-week as a colourful computerised animation or 2D and 3D ultrasound scans that have been digitally manipulated to render them aesthetically appealing. These images replicate the softly pink, glowing portrayals of miraculous unborn life typical of Nilsson's style.

Other apps adopt a more contemporary aesthetic and allow parents to store and manipulate images of their foetal ultrasounds and then share them via social media. The 'Pimp My Ultrasound' app, for example, invites prospective parents to manipulate images of their foetal ultrasounds by adding in novelty features to the foetal image such as baby dresses, jewelry; credit cards and musical instruments. The 'Hello Mommy!' app creates its own sort of arounds taken of the users' foetus, while the 'Ultrasound Viewer' app lets users manipulate their 3/4 foetal ultrasound images: 'Have fun viewing it from every angle, rotating, panning and zooming to see your babies [sic] features and share with your family and friends via Facebook and Twitter! ... Once uploaded, you can customise your scan with a background colour and skin colour of your choice'.

**Discussion**

Pregnancy, like any other form of embodiment, is performative. Pregnant women are expected to conform to norms and assumptions about their physical appearance and deportment of their bodies that they are being made to remain well-groomed, fit and physically attractive without appearing overly sexual (Longhurst "(Ad)Dressing Pregnancy in New Zealand, " Sexual Clothing, Fashion, Subjectivities and Spatialities", Longhurst "Corporeroographies of Pregnancy: ‘Bikini Babies’: Nash; Little". Simultaneously they must negotiate the burden of bodily management in the interests of risk regulation. They are expected to protect their vulnerable unborn from potential dangers by stringently disciplining their bodies and policing to what substances they allow entry (Lupton The Social Worlds of the Unborn; Lupton The Social Worlds of the Unborn; 'The Public Life of the Fetal Sonogram: Technology, Consumption and the Politics of Reproduction'). Further, the gamification and ludification of pregnancy serve to further commodify the experience of pregnancy and childbirth,_signup for an already highly commercialised environment in which expectant parents, and particularly mothers, are invited to purchase many goods and services related to pregnancy and early parenthood (Taylor "Of Sonograms and Baby Prams: Prenatal Diagnosis, Pregnancy, and Consumption"; Krolak; Thomson et al.; Taylor The Public Life of the Fetal Sonogram: Technology, Consumption and the Politics of Reproduction; Thomas). In the games for girls, pregnancy and birth are sold to the user via the 'Bump Friend' app, which features a 'Hi Mommy!': The Personalisation and Aestheticisation of the Foetus

In the games for girls we examined, the pregnant woman herself was a commodity, a selling point for the app. The foetus was also frequently commodified in its representations as an emasculated and objectified entity and the employment of its image (either as an ultrasound or other visual representations) or identity to market apps such as the 'girls' games, apps for manipulating ultrasound images, games for predicting the foetus's sex and choosing its name, and prank apps using fake sonograms purporting to reveal a foetus inside a person's body. As the pregnant user engages in apps, she becomes a commodity in yet another way: the generator of personal data that are marketable in themselves. In this era of the digital data knowledge economy, the personal information about people gathered from their online interactions and content creation has become highly profitable for third parties (Andrejevic; van Dijck). Given that pregnant women are usually in the market for many new goods and services, their personal data is a key target for data mining companies, who harvest it to sell to advertisers (Marwick).

To conclude, our analysis suggests that gamification and ludicification strategies directed at pregnancy and childbirth can serve to obfuscate the societal pressures that expect and seek to motivate pregnant women to maintain physical fitness and attractiveness, simultaneously ensuring that they protect their foetuses from all possible risks. In achieving both ends, women are encouraged to engage in intense self-monitoring and regulation of their bodies. These apps also reproduce concepts of the unborn entity as a precious and beautiful already-human. These types of portrayals have important implications for how young girls learn about pregnancy and childbirth, for pregnant women's experiences and for concepts of foetal personhood that in turn may influence women's reproductive rights and abortion politics.

**References**


Many commentators have remarked on the sexism inherent in digital games (e.g. Dickerman, Christensen and Kerl-McClain; Thornham). Very little research has been conducted specifically on the gendered nature of app games. However our analysis suggests that, at least in relation to the pregnant woman, reductionist heterosexual views of pregnancy and childbirth (for example the foetal sonogram), purporting to reveal a foetus inside a person's body. As the pregnant user engages in apps, she becomes a commodity in yet another way: the generator of personal data that are marketable in themselves. In this era of the digital data knowledge economy, the personal information about people gathered from their online interactions and content creation has become highly profitable for third parties (Andrejevic; van Dijck). Given that pregnant women are usually in the market for many new goods and services, their personal data is a key target for data mining companies, who harvest it to sell to advertisers (Marwick).

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