

Intelligent Systems Reference Library 241

Anthony L. Brooks *Editor*

# Creating Digitally

Shifting Boundaries: Arts and  
Technologies—Contemporary  
Applications and Concepts

 Springer

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Editor

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*Editor*

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# Preface

This book's preface shares how the book was conceived, researched, and put together, as well as linking it to the editor's credentials. Over 100 abstract texts were submitted proposing chapters for the volume that were weeded down to the selections herein. Up front, I thank all the authors for their time, efforts, and patience in achieving their publication, hopefully something that they are proud to have alongside others in this book and maybe even on their bookshelves in a physical form. The journey to finalize the book was arduous with issues arising and causing delays that need not be shared in a preface. In this opening, I introduce by acknowledgement what has been a big part of my *Creating Digitally* life and endeavor for the last 20 years or so that led to this volume.

The title *Creating Digitally* acknowledges Aalborg University (AAU), and especially those people involved in the Medialogy (Medialogi in Danish) education from over the years across campuses in three regions of Denmark. Both this book and the Medialogy education have a common central focus upon creativity and technology. In acknowledging as such I inform that this book had been planned to include my own penned chapters on Medialogy to share what it is alongside some of its untold stories and history. In doing so, the original plan was thus an attempt toward supporting the positioning of the education in its rightful place alongside others where comprehension of denotation is unquestioned. My authoring agreement from Aalborg University in sharing the Medialogy story and history reflects that at the time of my transition to emeritus, in early fall 2023, credentials included that I was the last remaining employee from the originating team behind the education's forming, thus many stories are known by me solely. However, or course, these are not all encompassing, but offer insight that many others involved are unaware of and can reflect their own sides. I was heavily involved in the birth of Medialogy, in fact, being involved much earlier than others on the initial AAU employment and student rosters for Medialogy's initial delivery in the Danish higher education system. This is posited after initially meeting and discussing on the concept with the "founding father" of Medialogy Professor Jens Arnsparng when I was first artist/researcher in residence at CAVI—the Centre for Advanced Visualization and Interaction—located at Aarhus University around the turn of the millennium. Jens visited with around eight of his

PhD students and I presented my research to them all. Some would later visit my applied research projects<sup>1</sup>, notably at the Centre for Rehabilitation of Brain Injury, Copenhagen University<sup>2</sup>.

At the time of the initial meeting, my research had already been responsible for receiving sizable national (Danish) and international (European) funding grants for my sole designed projects. My research led to being invited onto the coordination board leading the “European Network in Intelligent Information Interfaces (i3net)” — a project funded under the European Commission’s 5th Framework Program (5FP) for Long Term Research associated to market requirements and citizens needs aligned to the emerging information society. Via my i3net role I comprehended 5FP’s identifying, in the mid-90s, how European (this was pre-Brexit) industry lagged the rest of the world being both weak in terms of hardware and software products and stagnant in terms of computer services. Further, it questioned employment, exclusion, and culture (and more) relative to an identified low level of investment (per employee) that had direct consequences on the adoption of the new technologies. The emerging vision from the program was investment for developing a European information society, able to match traditional humanistic and social values to satisfy the expectations of the citizens for an improved quality of life, economic growth, and employment<sup>3</sup>. A goal was to compete with those other global powers who were leading in these aspects, i.e., America and Asia-Pacific.

It can thus be argued how Medialogy was formed to offer an education and, eventually, apropos under AAU’s flagship Problem—Based Learning (PBL—or POPBL: Project—Oriented Problem—Based Learning) toward promoting scholarly research, knowledge, and experiences that would provide, albeit minuscule in comparison, an effective contribution to the creation of a European Information Society—one of the key objectives for the 5FP<sup>4</sup>. Just as any form of education targets student vocations post their higher education studies, Medialogy was conceived with diligent consciousness to support graduating students in their future endeavors.

From subsequent discussions between Jens and myself, my understanding was that, following its initial conceptualizing, the education form proposed to various universities around the last years of the 1990s had no adopters. It was hinted at the time that this lack of uptake was due to Medialogy’s distancing from traditional topics and subjects in title and structure. This alongside its hybrid untraditional form sitting on the cusp between the arts and sciences and its focus upon relations to the human and society as central by targeting, within the education, courses on understanding humans, for example, in their sensing, perception, and cognition aligned to their (designed for) use of products. The designing of human interactions; creation of hardware prototypes; and related programming of software and the questioning of related aesthetics, ethics, and justifications became integral to the holistic

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<sup>1</sup> For example, HUMANICS 1 & 2 <https://www.researchgate.net/publication/237769859> <https://vbn.aau.dk/ws/portalfiles/portal/18596205/pdf>.

<sup>2</sup> [https://link.springer.com/chapter/10.1007/978-1-4757-5569-5\\_17](https://link.springer.com/chapter/10.1007/978-1-4757-5569-5_17).

<sup>3</sup> [https://www.ercim.eu/publication/Ercim\\_News/enw29/chasseriaux2.html](https://www.ercim.eu/publication/Ercim_News/enw29/chasseriaux2.html).

<sup>4</sup> <https://cordis.europa.eu/programme/id/FP5>.

entity that Medialogy was to become following our meetings. By incorporating these elements as a synthesized offering, it can be reflected how management traditionalists within Danish higher education establishments may have been provoked, indifferent, and alienated to not adopt. Those involved at the time, and even ensuing, may reflect how Medialogy was avantgarde and ahead of its time through its potential targeting of future challenges as identified by “The Information Society Forum” set up by the “European Commission” in February 1995 to consider social, societal, and cultural aspects. In its form sculptured and fine-tuned following our exchanges, Jens eventually found sympathetic ears and Medialogy eventually began in the small city campus of Esbjerg on the Danish southwest coast under Aalborg University. Timing was right, as the twentieth century had just transitioned into the twenty-first century, and contemporary entities within education, research, and industry—especially within the fields of information and communications technologies—grew and became more intertwined in a transdisciplinary fashion. This development aligned with the European Commission’s creation of a Future and Emerging Technologies (FET) call under its Information and Communication Technologies (ICT) programs where it reiterated how an increased synergy between the different players in the information society: researchers, industry, service providers, and users were necessary. Accordingly, since conception, the Medialogy education design targeted external collaborations for student projects across sectors of interest and influence.

Within my own research in the preceding period, projects titled Human Interactive Communication Systems (HUMANICS)<sup>5</sup>; The World Is As You See It (TWIAYSD); and Creating Aesthetically Resonant Environments for Handicapped, Elderly, and Rehabilitation (CAREHERE) all received sizeable funding support that led to the creation of a family of published patents with myself as inventor and a spin-out company called Personal Interactive Communication Systems (PERSONICS). All entities targeted social, societal, and cultural human-centered computing with goals to impact, benefit, and educate—utilizing creativity and technology—within contexts unfamiliar with such interventions. My (Creating Digitally) research focus was on helping therapists to advance (re)habilitation interventions and their patients’ experiences and improvement whereby patients were across the spectrum of age, abilities, and situation. Thus, I targeted the most challenging cases (aligned to abilities) as well as those less challenging (more able) with the understanding from experiences that the created digital systems could be adapted to each individual or group as determined by profile(s)—including needs, desires, preferences, and targeted outcomes from interventions (as advised by medical professionals). In the 1990s, sensors and multimedia were prevalent in their advancement alongside software that could easily map (or route and adjust) data sourced from a human by sensors to manipulate multimedia. The manipulation of the multimedia opened a channel for direct feedback such that within an optimally tailored interactive system (according to a patient’s profile,

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<sup>5</sup> HUMANICS was my design for an “At-Home Rehabilitative Exercise” sensor-based system for stroke patients, investigated at Denmark’s leading clinic for acquired brain injury rehabilitation while PERSONICS targeted adaptive systems that built upon HUMANICS incorporating video games in (re)habilitation alongside empowered creativity.



etc.,) a typical process chain changes from human feedforward (afferent to efferent to motoric to multimedia) to a situation where the feedback takes over leading within the afferent efferent neural feedback loop closure cycle. A control of feedback to feedback controlling motion if you like (think Hendrix). This has been known to drive a participant to expand their motoric gesticulations as opposed to a more traditional situation where consciousness may restrict.

The sensors originally conceived and created for my own research were an infrared emitter and receiver replacing a light bulb on a cheap swan neck lighting product. A single neck/sensor eventually transitioned to become a three-headed version, thus enabling a person to manipulate multimedia in the form of musical compositions (e.g., three sounds) or color visuals (RGB/HSV) or navigate in gameplay. Such manipulated audiovisuals included early interactive games (made in Macromedia Flash) that were played via recognized gestures. Accordingly, I am acknowledged as one of the first to use such channels of feedback (directly responding to feedforward actions) within healthcare (re)habilitation in this way. The data generated within the interactive environment can also be used for analysis. The same systems used in the healthcare (re)habilitation interventions were used in my art works, e.g., interactive installations and stage performances. Both entities I found to be cross-informing whereby the (re)habilitation interventions informed the art interventions that concurrently informed the (re)habilitation interventions. This cross-informing I relate to creative thinking. Thus, when I read articles, such as the 2016 titled “Person-Centered Multimedia Computing: A New Paradigm Inspired by Assistive and Rehabilitative Applications”<sup>6</sup>, I look back at the period introduced herein, the projects, the Medialogy education, and smile at having been avantgarde in pioneering and contributing in the way I did.

Thus, the originally planned authoring of Medialogy in this volume was toward a history garnered from experiences I encountered, thus not all encompassing. However, a need for the education’s history was identified by me and many others following discussions after identifying how texts describing the education had fallen short over the years, typically in delimited conference papers or journal article forms. Typically, such authoring was penned by those not having the credentials and such a history innate to Medialogy as myself. This was especially so when I identified similarity to a contemporary education, I considered aligned to Medialogy titled as “Human-Centered Computing (HCC)”<sup>7</sup> which “studies the design, development, and deployment of mixed-initiative human-computer systems. It is emerged from the convergence of multiple disciplines that are concerned both with understanding human beings and with the design of computational artifacts” additionally, “Human-centered computing (HCC) has emerged as a major subfield of computational science and emphasizes the understanding of human behavior, needs, and expectations in the

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<sup>6</sup> S. Panchanathan, S. Chakraborty, T. McDaniel and R. Tadayon, “Person-Centered Multimedia Computing: A New Paradigm Inspired by Assistive and Rehabilitative Applications”, in *IEEE MultiMedia*, vol. 23, no. 3, pp. 12–19, July-September 2016, doi: <https://doi.org/10.1109/MMUL.2016.51>.

<sup>7</sup> [https://en.wikipedia.org/wiki/Human-centered\\_computing](https://en.wikipedia.org/wiki/Human-centered_computing).

design and development of technologies”. Subsequently, literature states how “HCC principles and methods have served researchers well, the increasing need for individualized solutions warrants a person-centered approach” thus leading to “Person-Centered Multimedia Computing” as argued by Panchanathan et al. (see footnote). In this cited work, referencing Mozaffarian et al (2015)<sup>8</sup>, it states how “Motor rehabilitation has gained substantial traction as an application area of multimedia computing. More than 795,000 Americans are diagnosed annually with having experienced a stroke, resulting in costs of over US\$34 billion per year. The rise of ubiquitous technology capable of sensing and responding to human behavior has granted an increased sense of autonomy to individuals in a wide variety of motor rehabilitation programs. Researchers are exploring new ways in which multimedia systems can interact with these users in both clinical and nonclinical environments”. Thus, aligned to this train of thought and statistics, and from my own research of approximately four decades on this very subject, it seemed obvious that there were business opportunities to create solutions to such challenges and this is how Medialogy students were educated to think, and many started their own spin-out companies from their education projects—especially in Esbjerg where a dedicated business support framework networked with industries was created. A number of these spin-out companies, consisting of students I had supervised, focused upon motor rehabilitation training and well-being implementing technologies such as Virtual Reality, thus following in their supervisor’s footsteps. The education was a great success as was many of the students’ companies. I consider myself fortunate to having been a part of the Medialogy team for over two decades since being a member of the founding team of the education, wherein it’s been acknowledged my input has had significant influence pre- and post- it’s realization. A TED talk<sup>9</sup> is online by Professor Jens Arnsparng informing on Medialogy wherein he acknowledges my input. My Medialogy chapters planned for this book were eventually placed aside due to the unexpected mass of responses received by authors from around the world wishing to contribute to this topic of “Creating Digitally” and related “Shifting Boundaries: Arts and Technologies—Contemporary Applications and Concepts”. There were only so many pages planned. Thus, my Medialogy authoring will follow as will a book on my selected published works, rather than leaving for another to (mis)interpret posthumously. Suffice to say for now that readers have ahead in this book over 20 chapters from digital creatives living around the world who share their stories and histories as I introduce with Medialogy. There is diversity in topic and meaning within the chapters and as a whole the result is a volume that I am proud to be editor of.

In closing, fondly, I recall how early in the Medialogy education the first-semester students in Esbjerg read an article of my nickname being Mister Beam<sup>10</sup> due to the

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<sup>8</sup> D. Mozaffarian et al., “Heart Disease and Stroke Statistics—2015 Update: A Report from the American Heart Association”, *Circulation*, vol. 131, no. 4, pp. 29–322, 2015.

<sup>9</sup> ‘Medialogy—bridging science of nature with creativity and art | Jens Arnsparng | TEDxREAL’—<https://www.youtube.com/watch?v=KnGKGvDnhwg>.

<sup>10</sup> Brooks, A. (2000). Mr. Beam. Journal of the European Network for Intelligent Information Interfaces [http://www.i3net.org/ser\\_pub/services/magazine/march2001/i3mag10.pdf](http://www.i3net.org/ser_pub/services/magazine/march2001/i3mag10.pdf) pp. 2–6.

sensor beams invented and implemented in my research, which I showed in class. They picked up on this nickname and transitioned it to become “Mister Medialogy” that they informed me was due to their experiencing my obvious commitment following hearing of my preconceptual and initial inputs to the education from Professor Jens Arnsfang in his lectures: That was a tag I carried with a smile over many years even though I believed it more fitting for Jens who in meeting changed my life.... I hope that you dear reader have such good fortune as I did. Enjoy your read...

Aalborg, Denmark

Anthony L. Brooks

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# Chapter 20

## Design of a Bespoke Web-Based 3D Virtual Venue and Video Streaming Event Platform



Ramón Iván Barraza Castillo, Alejandra Lucía De La Torre Rodríguez, Iris Iddaly Méndez-Gurrola, and Anahí Solís Chávez

**Abstract** As technology advances, enterprises, retail stores, museums, universities, and other organizations have learned to adapt to the ever-changing challenge of drawing public attention to their offerings. This has become even more important in the current era we are living in, where not having a digital presence severely hinders their possibilities to reach a broader market. This issue has drawn even more attention in the past two years as the COVID-19 pandemic spiked the need to hold remote seminars, conferences, classes, and other events through videoconferencing platforms. As with other organizations, universities have been using their websites to promote academic programs, campus installations, events, and amenities and since have expanded to social media platforms and mobile applications to offer more features to both the students and visitors. Colleges and universities across the world have been integrating multimedia resources such as panoramic photos, 360-degree videos, interactive maps, and guided tours of their campuses either from their website or mobile app. To further expand on this idea, and in an effort to reproduce the experience of attending an event in a physical location, albeit, to a certain extent; an interdisciplinary team of digital design, interior design, graphic design, and computers science students, along with professors at Ciudad Juárez Autonomous University, developed a virtual venue that will be accessible from the university web site. Though the concept is not entirely new, the approach and developing process aims to produce a modern, configurable, and flexible platform that allows more freedom for the end users. Attendees will be able to interact with the environment,

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