



# RoboCoach, quo vadis?

Technological innovation impacts the social context and the practice of coaching. A proposal for the categorization of the patterns and prospects of change.

**Luc Scheer**

Mémoire soutenu le 20 juin 2014  
en vue de l'obtention du titre « Coach Professionnel »

Ecrit sous la direction de **Dr Sybille Persson**

Produit dans le cadre de la formation de **Coach Professionnel**  
de l'**ICN Business School**

II<sup>e</sup> promotion ICN Business School/ Luxembourg School for Commerce  
2013/2014

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Luc Scheer

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## **The Three Laws of Robotics**

1. A robot may not injure a human being or, through inaction, allow a human being to come to harm.
2. A robot must obey the orders given to it by human beings, except where such orders would conflict with the First Law.
3. A robot may not injure its own kind and defend its own kind unless it is interfering with the first or second rule.

Isaac Asimov (Asimov, 1942)

## **The Medium is the Message**

Marshall McLuhan (McLuhan & Fiore, 1967)



# Abstract

The first section of this thesis aims at outlining technological innovation, new scientific findings and socio-economic change which impact the context and the practice of coaching. After this analysis, a categorization of the patterns and potentialities of change in the coaching practice is proposed in the second part. This categorization can serve as a future frame of reference for an in-depth monitoring and study of the impact of changes in applied technology on the practice of coaching.

Three major typologies of change emerge: Firstly, communication technology expanding the traditional face to face practice. Secondly, analytical technology and scientific knowledge having the potential of changing the practice of coaching by making new resources available. Thirdly, software that is of a nature to potentially replace the human coach partially or entirely.

While technologies are not at the same level of maturity in the three categories and do not offer the same future prospects, it emerges that technology-based coaching is here to stay and to grow. Blended coaching is to play a particularly important role in a context in which economic drivers and technological change push coaches and their clients to become ever more time- and cost-efficient.

**Key words: coaching; e-coaching; distance coaching; blended coaching; artificial intelligence; augmented reality; virtual reality**

**Mots-clés : coaching; e-coaching; coaching à distance; coaching hybride; intelligence artificielle; réalité augmentée; réalité virtuelle**

## Acknowledgements

I would like to express my heartfelt gratitude to all those who contributed directly or indirectly to the research and the writing of this thesis.

First and foremost my thanks go to Dr Sybille Persson, head of the ICN coaching school and Laurent Goldstein, program director and coach emeritus, who have provided critical advice, inspiration and encouragement throughout the process.

I also owe particular recognition to my fellow students in the program, specifically to the members of the Luxembourg City based "GEM" for their support in the definition of the topic of this thesis. Special thanks go to Delphine Charuel and Séverine Terrana for their critical eye and to Dr Rémi Fabbri for challenging me in an extremely constructive way with regard to the structure and the thesis formulated.

Last but not least, I would like to thank my family and my colleagues for supporting me in this endeavour despite its impact on my availability for them.

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# Introduction

RoboCoach, quo vadis? The title of this thesis requires some explanation as to its meaning as well with regard to its intent.

The term “RoboCoach” is inspired by “RoboCop”, the hero of the eponymous 1987 movie directed by Paul Verhoeven in which Peter Weller stars as a cyborg policeman in a crime-ridden, dystopian Detroit. Half human, half machine, RoboCop not only fights the villains but his human conscience struggles with and, in the end, prevails over the programming by his conceivers who had perverted Asimov’s “Three Laws of Robotics”. (Asimov, 1942)<sup>1</sup>

The neologism “RoboCoach” aims at positioning the topic of coaching in the context of the evolution of the man-machine relationship in “western” civilization.

“Quo vadis?” means “Where are you going?” It is a powerful, fundamental question, expressing surprise, profound interrogation and doubt. It positions the topic in the broader context of classical occidental beliefs and culture. <sup>2</sup>

RoboCoach, quo vadis? is hence the expression of an attempt to capture the change that man-made technology effects on the practice of coaching as an activity that is historically based on essentially technology-free human to human interaction, the fundamental concepts of which can be argued to have been defined since Aristotle and Socrates. (The International Coach Federation, 2013)

“RoboCoach quo vadis?” clearly suggests the interrogation about the perspective of the replacement of the human by a robot i.e. by a machine for implementing the cognitive process of coaching. More than six decades after Alan Turing published the “Turing Test”, a proposal for a methodology for evaluating whether

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<sup>1</sup> It appears relevant to note here that the term “robot” derives from the Czech word “robota” which means “labour”. The term “Robot” was coined by Czech cubist painter and writer Josef Capek and first appeared in his brother Karel Capek’s play RUR (Rossum’s Universal Robots) in 1920. (Capek, 1920) It was aimed at describing “slave machines” at the entire service of their human creators.

<sup>2</sup> It is a question Saint Peter, while fleeing crucifixion by the Romans, asks a “risen” Christ who rekindles Peter’s faith by saying: ““Whither I go, thou canst not follow me now; but thou shalt follow me.” (Tyndale, 1525)

machines can “think” in his seminal article “Computing Machinery and Intelligence” (Turing, 1950) (Saygin, et al., 2000), no program has successfully passed the test. (Pavlus, 2012) Still, one of the lingering questions for theorists and practitioners of coaching alike is indeed if, or rather how, machines in general and artificial intelligence in particular, boosted by the exponential development of computing power can complement or replace human intervention in the coaching relationship.

Even if we have the impression that RoboCoach is neither here nor near, technology is undeniably making progress and having an impact on the ways coach and coachee can and will interact. Furthermore, academic research, for instance in the area of neuroscience, is generating new insights that lead to the emergence of sophisticated analytical tools that could modify the practice of coaching quite significantly in the short to medium term.

In the first part of this thesis we are going to review the technological developments shaping the environment of coaching as well as social and economic evolutions that change the context of the exercise of this activity.

In the second part we will be proposing a broad categorization of drivers of change, distinguishing between:

- technology that **extends** the possibilities of human-to-human interaction,
- potential new solutions that can **change** the way the coach understands and impacts the coachee and interacts with him and thirdly
- technology that can **supplement or replace** the coach in his or her relationship to the coachee.

If we look at the coaching relationship<sup>3</sup> as an interaction between two individuals,

- the first of the three above categories essentially covers aspects related to the way coach and coachee communicate. We will hence be looking at technological aspects affecting the **relationship** as such. (1)
- The second category groups technological changes pertaining to the **coachee** and the way he can be “apprehended” by the coach thanks to new technology. (2)
- Developments affecting the function of the **coach** are reviewed in the third category. (3)

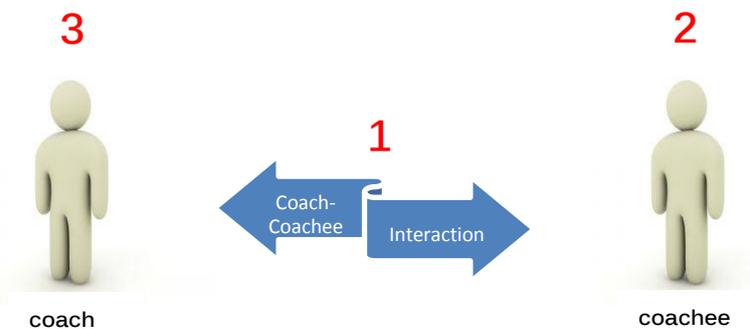


Figure 1: Technology and the environment impact the coach, the coachee and the interaction between the two.

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<sup>3</sup> For the purpose of this thesis we will focus on professional one-on-one coaching. This means that aspects related to other forms of practice such as team coaching for instance are not explicitly addressed. We will not further develop on the term coach, its etymology, its various denotations and connotations nor its varying acceptations other than to refer the reader to definitions of coaching such as the one put forward by the International Coach Federation which describes the activity as “partnering with clients in a thought-provoking and creative process that inspires them to maximize their personal and professional potential.” (International Coach Federation, 2014).

# I. An overview of technological and socio-economic changes to the environment of coaching

In the same way RoboCop became only “feasible” in a given (fictional) social and technological context, the current practice of coaching and its possible future evolutions (RoboCoach?), need to be analysed in a frame of reference. The aim of the first part of this thesis is to outline this frame, investigating first the technological trends before briefly looking at social and economic drivers.

## A. Scientific and technological developments shaping the environment of coaching

In this section we are going to review technological developments in the areas of information technology as well as techniques to measure and interpret human behaviour and emotions. Additionally, aspects of neuroscience that can be relevant to coaching are going to be explored.

### 1. Information technology

Information technology has become ubiquitous with more than 1.2 billion personal computers installed globally as of 2011. (Wolfram Alpha, 2014) and a global penetration of mobile telephony of 89 subscriptions for 100 inhabitants as of 2012 (World Bank Group, 2014).

Furthermore, the computing performance of the devices has grown almost by a factor of one million in the past four decades, proving Moore’s law stipulating that: *“The number of transistors incorporated in a chip will approximately double every 24 months.”* (Moore, 1965)



3G and 4G networks cover over 50% of the world population as of 2013. But even 2G mobile technology, which in 2014 is still the staple for roughly two thirds of the users already offers the possibility of SMS texting. (Potter, 2013)

The development of largely platform independent communication software, mobile networks, the widespread ownership of multiple devices including in particular smartphones and connected tablets are changing the possibilities and the realities of societies.

## **2. Electronic detection, recognition and analysis of patterns of human emotions and behaviour**

Since the invention of the polygraph in 1921 (Bellis, 1997), technological tools rather than mere questionnaires or reference lists are available to assess human behaviour and evaluate emotions.

The polygraph measuring physiological parameters such as blood pressure, pulse, respiration, and skin conductivity is being widely used but polygraphs are often criticized. In 2003 a US government funded study came to the conclusion that: "Almost a century of research in scientific psychology and physiology provides little basis for the expectation that a polygraph test could have extremely high accuracy. Although psychological states often associated with deception (e.g., fear of being judged deceptive) do tend to affect the physiological responses that the polygraph measures, these same states can arise in the absence of deception." (Committee to Review the Scientific Evidence on the Polygraph, 2003).

Despite this, the polygraph continues to be used in law enforcement and justice in many countries and remains the best known technology in the category. Research conducted by the American Polygraph Association indicated for instance that the majority of police departments in the US use polygraph tests in the recruitment process for police officers. (APA Research Center, 2010)

Research work on other technologies aiming at analysing human emotions such as voice analysis has been taking place for over 50 years. (Lippold, 1957)

Today voice stress analysis remains a controversial technology. A review of two types of commercially available detectors comes to the conclusion that both

machines “perform at chance level” and that there is “no scientific evidence to support the manufacturers’ claims” that the “detection” is based on voice analysis. (Eriksson & Lacerda, 2007)

The automated detection and analysis of facial micro-expressions, albeit still under development, appears to be more promising: Thomas Pfister of Oxford University’s Department of Engineering works on software to analyse facial micro-expressions, i.e. very small movements of the face that are visible for only a fraction of a second and that are supposed to give an insight on emotions that the studied subject tries to hide. Pfister claims that human detection accuracies reported in literature are significantly lower than the 79% accuracy achieved by his software. (Wilton, 2011)

The analysis of body movement already has mass market applications with products such as Microsoft’s Kinect motion sensing, launched in 2010, although without a focus on the analysis of the expression of emotions. (Blake & al, 2014)



**Figure 3: Microsoft’s Kinect v.2 to be launched mid-2014 is expected to allow professional developments**

A new version of Kinect for computers and mobile devices running the Microsoft Windows operating system is to be launched in mid 2014. According to the company “The Kinect for Windows v2 has been re-engineered with major enhancements in color fidelity, video definition, field of view, depth perception, and skeletal tracking.”...“the v2 sensor offers greater overall precision, improved responsiveness, and intuitive capabilities that will accelerate (the) development of voice and gesture experiences” (Microsoft, 2014)

As of April 2014, Reflexion Health, a US-based technology company was developing a “prescriptive” software application named “Vera” that aims at implementing computer aided and monitored physiotherapeutic programs for patients at home. (Microsoft, 2014)

An application has been developed to implement a computerised analysis of movements at New York University’s Movement Laboratory. The project “Gesture Cloud” has been published on the web in 2012 (Bregler, 2012) and features an interpretation of the gestures of presidential candidates Barack Obama and Mitt Romney during televised debates. Undoubtedly representing an interesting technical development, the tool helps with the evaluation of the effectiveness and meaning of a probably quite conscious and trained non-verbal language. However it is not offering a real resource for distinguishing between involuntary emotional expressions and purposeful voluntary gestures.

Even if the NYU Movement Lab states that “According to body language, Obama really cares about “jobs”, “business” and “companies” more than Romney”, the author does not provide any information on a scientific procedure cementing this claim. (Bregler, 2012)

Most research surveyed appears to be focusing primarily on developments facilitating intentional Human-Computer Interaction (HCI) rather than on providing humans interpretative assistance on other humans. (Lyons, 2004)

Nevertheless, conclusive research work on processes combining audio and visual analysis to capture human emotions has already been carried out in 2004: the Emotion Research Group at USC Los Angeles (Busso, et al., 2004) has tested both voice analysis and video analysis of facial expressions to identify the 6 archetypal human emotions<sup>4</sup> and states that “...even though the system based on audio information had poorer performance than the facial expression emotion classifier, its features have valuable information about emotions that cannot be extracted from the visual information.” Research demonstrates that combining voice and visual recognition generates redundant information, improving the performance of the system. (Busso, et al., 2004)

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<sup>4</sup> The 6 archetypal human emotions are surprise, fear, disgust, anger, happiness, and sadness (Rothkranz & Wiggins, 2009)

### 3. Neuroscience

In order to understand the possible future impact of developments in neuroscience on coaching it is relevant to consider “neurobehavioral modelling” as “the means by which an executive coach, who has a working knowledge of the brain and mind, interacts with a client brain to brain (sic), for the contractually agreed purpose of creating structural change in the brain of the client so that behaviour changes, the self is modified and the gains made are consolidated over time into lasting and sustainable change.” (Brown & Brown, 2012)

Commercial actors such as the Centre for Advanced Coaching claim (Advanced Coaching, 2014) that “neurocoaching is a masters level research-based coaching technique” and offer training to obtain certification. The Institute for Cellular and Molecular Medicine and the Departments of Physiology and Psychology of the University of Pretoria in collaboration with UGSM-Monarch Business School Switzerland offers an online course called “Introduction to Neuroscience Coaching” (University of Pretoria, 2013) that combines an overview of neuro-physiological and psycho-physiological findings claimed to be relevant for a “neuroscience approach to coaching”.

The complexity of neurological processes is a key factor to be taken into account: “Contrary to the model of brain processing that prevailed during the mechanistic era, our sensing and interpreting functions are intertwined. However, much of the interpreting that is connected to sensing is in the nature of the neurons and the brain itself, as with mirror neurons, and thus does not occur consciously.” (Rock & Page, 2009)

The authors stress that “having the capacity to ignore present inputs and to create our own narrative reality depends on our brain’s ability to create patterns of connections that are often called “mental maps”. Making such linkages, especially novel ones, is something the brain does automatically.” (Rock & Page, 2009)

Neuroscience allows understanding the biochemical processes of human reactions. If and when the brain detects changes in the environment it sends strong signals to alert to the unusual. According to Jeffrey M. Schwartz, M.D. “these error detection signals are generated by a part of the brain call the orbital cortex that is closely connected to the brain’s fear circuitry in a structure called the amygdala. These two areas compete with and direct brain resources away

from the prefrontal region that promotes and supports higher intellectual functions.” (Rock, 2006).

It can be concluded from cited literature that neuro-scientific knowledge can be a direct enabler in traditional coaching practices. However it will be most interesting to see how these scientific findings can be used in the development of technological aids for the coach and/or the coachee. Future trends could not be derived from consulted literature.

## B. Social and economic drivers of change influencing the offer and the practice of coaching

While scientific progress and technological innovation are the “prime suspects” as drivers of a change to coaching, the social environment is in a deep evolution for reasons related both to changes in technology and to economic mechanisms.

### 1. The impact of information technology on human behaviour

Early research, such as the work of Sherry Turkle, Professor of the Social Studies of Science and Technology at MIT highlighted already in 1984 the effect of the computer on humans: She focused not so much on the “instrumental computer,” i.e. on what work the computer will do but on the “subjective computer” as machine that “enters into social life and psychological development, the computer as it affects the way that we think, especially the way we think about ourselves.” (Turkle, 2005)

According to Turkle the question is not “What will the computer be like in the future?” but “What will we be like? What kind of people are we becoming?” (Turkle, 2005)

Technology itself has delivered the answer. In her latest book, Sherry Turkle states that “technology proposes itself as the architect of our intimacies” and confirms the impact of technology on human relations, saying: “We fear the risks and disappointments with our fellow humans. We expect more from technology and less from each other.” (Turkle, 2011)

With this analysis on the interactions between the human and the machine in mind it becomes evident that the emergence of the so-called “social media” where the machine manages and modifies human to human interaction represents a significant driver of change. Additionally the speed of evolution in this particular field of study is such that academia struggles to keep pace with the changes happening in technology and those that they induce in the area of social behaviour.

## **2. Social networks change society**

“Digital sociology” is an emerging area of research in social sciences (Orton-Johnson & Prior, 2013) that aims at documenting and understanding the fundamental impact of social networks such as Facebook, Twitter, Instagram or LinkedIn. According to company data, Facebook alone had more than 1.23 billion active users as of January 2014 (Sedghi, 2014) of which 48% log in on any given day. Half of the users log in from mobile devices and spend an average of 18 minutes per connection generating 150.000 messages per minute according to Facebook.

Considering that the company was founded in 2004 and passed the 100 million users mark four years later, it becomes clear how recent and how massive this development is. The average number of “friends” per adult user was 338 at the end of 2013, with a median number of 200. This evolution profoundly changes the ways in which individuals and groups interact, impacting private and professional spheres as well as consumer and media behaviour. (Smith, 2014)

## **3. Economic growth entails a general “acceleration of time”**

Innovations and technological progress in transport can be considered as the initial driver for a “shrinking” view of the world. Anthropologist and geographer David Harvey states that “space appears to shrink to a ‘global village’ of telecommunications and a ‘spaceship earth’ of economic and ecological interdependencies” and “time horizons shorten to the point where the present is all there is.” (Harvey, 1989)

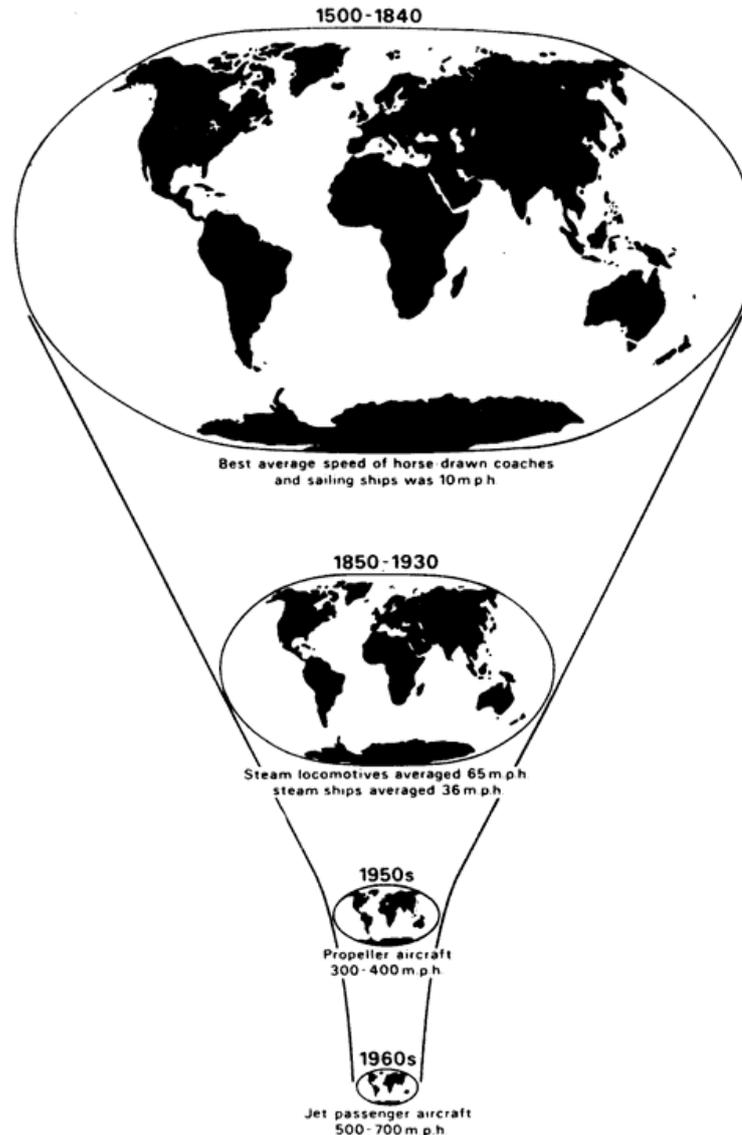


Figure 4: “The shrinking map of the world through innovations in transport which ‘annihilate space through time’,” is the caption of David Harvey’s illustration. (Harvey, 1989)

At the same period, James Gleick described money as “the visible currency of trade” and time as its “doppelgänger”. (Gleick, 2000)

“Acceleration of time” is an expression coined and a concept defined by German sociologist and political scientist Hartmut Rosa in 2005 in his seminal work “Beschleunigung”. Almost 30 years after Paul Virilio coined the term “dromology” to describe a speed-related approach to social and political sciences (Virilio, 1977), Rosa defines the acceleration of time as an increase of the number of life events (Handlungs- bzw. Erlebnisepisoden) in a given timeframe.

According to Rosa, the explanation can be found in the economic sphere: „The capitalist economy of time „forces“ (...) an increase in consumption intensity in line with the growth of the production rate as the added value can only be realised through consumption.” (Rosa, 2005) Consequently, the technological shifts we observe and the impact that they have on the functioning of society can be considered as the inevitable consequences of an economic dynamic.

With the acceleration observed towards the turn of the millennium as a consequence of the digital revolution, the small earth drawn by Harvey to characterise the jet age has shrunk to a mere dot. “Globalization” is the term generally applied to describe this latest stage of economic and social evolution.

Without trying to anticipate future developments or dwelling on the pessimistic scenarii developed by Rosa it is clear that the combined effect of the changes our world has undergone since the formal emergence of the concept of coaching in the twentieth century cannot remain without an impact on both the offer of and the demand for coaching as well as on the way coaching is practised.

## II. Typologizing the technological drivers of change that impact the practice of coaching

While virtual coaching, e-coaching, tele-coaching, online-coaching, cyber-coaching and cloud-coaching are popular buzzwords totalling over 350 million hits on the Google search engine (April 2014), surprisingly little academic work aiming at defining and categorizing coaching activities that involve the use of technology has been done. Some of the above ill- or undefined terms are used in an undifferentiating manner in place of other more mundane concepts such as distance coaching. (Kanatouri, 2013)

Bibliographical analysis on academic work on “e-coaching” highlights that research is mostly empirical, operational and quantitative, exploring topics such as clients’ and coaches’ attitudes towards e-coaching, factors affecting perceived success of e-coaching, client satisfaction, the development of coach-client relationship at a distance or the effectiveness of e-coaching. (Kanatouri, 2013) Other reviews of literature often point towards adjacent fields such as psychotherapy or mentoring for academic reference. (Ghods & Boyce, 2012)

In this section we attempt to build on the analysis of the scientific developments and the technological and social trends described in section 1 to propose a categorization of the drivers of change in coaching practices, providing a structured approach. While we outline possible broad tendencies, it will be left to more detailed research to expand on the future prospects that can be extrapolated based on current knowledge and the proposed typologies

### A. Communication technologies that allow going beyond face to face coaching

Communication technologies, starting with the telephone, tend to expand and facilitate the practice of one on one coaching work, essentially by lifting or easing physical boundaries and associated costs of face to face coaching.

This process is well underway and can be illustrated by a large variety of examples, a number of which have been studied in research on coaching.

The primary motivator for coaches to use technology in person to person coaching is to overcome the barriers of physical separation and geographical distance. It could without doubt be argued that the first technology available to carry out a coaching other than face to face was the letter. If today we do not find any reference to the notion of “epistolary coaching”, the explanation is most probably related to the fact that coaching in the acceptance that has been retained for this thesis (cf footnote 3) is chronologically posterior to the period when letters were the best available technology for distance coaching.

### **1. Audio- and audio-visual telecommunications technology**

The telephone can be considered as being the first and probably still the most prominent piece of technology used in coaching. In the past decade, the massive development of mobile telephony, VoIP technology, the erosion of telecommunications costs and the emergence of low-cost videophony (e.g. Skype) has not only made it easier but also more acceptable to conduct professional processes in general and coaching activities in particular via phone or computer-based audio-visual interfaces.

Proponents of the use of audio or audio-visual telecommunications technology mainly emphasize cost-effectiveness and flexibility while critics regret the loss of “bandwidth” in the interpersonal relationship it entails, depriving both coach and coachee of the “full picture” and physical presence that in-person meetings offer.

While there is a debate on the need and added value of the “full picture” in-person coaching sessions provide, some actually argue that phone coaching has the advantage of taking bias based on physical features and possible distracting or disturbing elements such as facial expressions or body language out of the equation.

A qualitative study carried out with a small sample of executive coaches in the UK (McLaughlin, 2013) gives the following feedback on coaches attitude towards coaching by telephone : “Not ‘do-able’ (often based on an assumption that technology acts as a barrier to the human connection) or ‘Second best’ to face-to-face interventions - therefore only adopted as a contingency plan when geographical distance, or lack of resources (time, funding etc.), i.e. practical obstacles to face-to-face working, demand an alternative solution or the ‘same as’ face-to-face coaching, and therefore wholly interchangeable” while stating at

the same time that a minority of the questioned coaches “spoke persuasively of the power and potential of the medium, often suggesting that it could offer ‘added value’ to face-to-face methods.”

Research carried out in France in 2009 with HR managers and potential candidates showed that while acceptance levels were also low, interest in distance coaching is significantly higher (43%) on the side of the potential coachees while only 23 % of HR managers would consider distance coaching. (Humbert, 2009)

More extensive but arguably older quantitative research is vague but positive: “Feedback or coaching by phone worked just about as well as feedback or coaching in person.” is one of the key findings of a field study involving 86000 participants in eight major corporations. (Goldsmith & Morgan, 2003)

## 2. Textual tools

Building on existing research on e-mail communications, a report on e-mentoring (Harrington, 1999) outlines the following characteristics of e-mail:

- asynchronous;
- text-based;
- dependent on computer-literacy;
- suitable for communicating with disparate groups.

The report also underlines that “text-based media are generally viewed as the most appropriate for processing large amounts of standard, accurate, objective and quantitative data.” It can be argued that coaching, like mentoring is a process requiring “richer”, more personal and more subjective exchanges and real-time reaction. But the author subsequently and somewhat surprisingly points out that “this is against a background where writing has been slow and more formal. Email actually offers a cheaper, more accessible medium and should not be compared with more traditional text-based communication.” (Harrington, 1999)

It is to be noted that online chats and texting can make textual communications almost synchronous. Commercial offers of coaching services via texting are available. One US-based provider offers packages ranging from the scheduled 30

minutes session to 7-day permanent availability for SMS responses. Alternatively asynchronous e-mail exchanges are also on offer. (Quintal-Snowman, 2014)

The various technologies that are being used or can be used for distance coaching can be categorized according their synchronous or asynchronous natures, as well as taking into account the channels and senses or technologies they are using. (Cf: section II.A.4)

The conditions under which technology is being used with target populations is equally an important consideration.

Andrew Wadsworth, an adjunct professor at the University of Illinois, recommends to avoid introducing technology that is new to the coachee into the coaching process, (Rossett & Marino, 2005) suggesting that “people being coached, especially executives, are so busy that they don’t have time to be trained (on new technology), so you need to use their communication channel of choice to quickly establish trust and credibility and launch the coaching process.”

The same research also shows that it is important to structure the way coach and coachee establish their relationship in the context of the introduction of technology into the working relationship: “In ... project, that connection was achieved through an intense three-week workshop before e-coaching began. Coaches and peers formed relationships during that time together in the workshop and that bond held over thousands of miles and limited communication channels.” At present, with improved and more accessible communications, he believes effective coaching requires at least an initial videoconference. (Rossett & Marino, 2005)

Other research concurs on the benefits of text-based distance coaching, stressing that the ideal fit between coach and coachee is more important than geographical presence and actually considers tele-coaching as an enabling element. “The extent to which the client thinks he or she will improve is more significant than other factors including whether or not the coach is working with them face-to-face.” (Mashihi, 2012)

### **3. Virtual reality as a “place” to carry out coaching**

The virtual “world” Second Life is not only a “place” where individuals spend leisure time. It is also being used by professionals and clients in a wide area of service activities, including consulting, therapy and coaching as well as for training in these areas of practice.

If both coach and coachee agree that their activity is merely a mutually agreed technology choice for carrying out distance coaching between two real life personae, it can be argued that the existence and the usage of platforms such as Second Life does not add new dimensions to the described spectrum of possibilities. It constitutes however a novel way to use or combine tools and to deliver coaching.<sup>5</sup>

Businesses such as the “Online Coaching Institute” have developed to cater to specific expectations of the coaching industry on Second Life and other platforms, offering “training and verification services that equip practitioners with all they need to be an ethically practicing online service provider, no matter what field they are in or what qualifications they hold.” (sic) (Anthony & Merz-Nagel, 2014)

Recent research shows that acceptance and efficiency of coaching practices in the virtual space essentially depend on the degree of familiarity and confidence that coachees have with the overall environment (Trehorel, 2011), corroborating older findings concerning the introduction of other online tools into coaching. (Rossett & Marino, 2005)

### **4. Overview of generic technologies suitable for distance coaching**

We have summarized the generic technologies suitable for distance coaching according to their synchronous or asynchronous nature and the media/senses that they mobilize.

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<sup>5</sup> The aspects related to virtual reality environments offering new, different tools to the “real life” coach and the coachee, will be treated in the next section of this thesis. The aspects related to the coaching of virtual characters will not be treated.

	Textual	Verbal	Visual	Multimedia	Virtual Reality
<b>Synchronous</b>	Chat software	Telephone, VoIP, Skype	Skype, Videocon	Skype pro, Google + hangout iMessage etc.	Second Life,...
<b>Asynchronous</b>	Mail, email, texting,	/	/	Skype pro Google + hangout iMessage, etc.	/

Figure 5: Overview of generic technologies suitable for distance coaching<sup>6</sup> (Scheer, 2014)

Dwelling further into the literature on the impact and acceptance of distance coaching, it appears that, depending on the technology used, distance coaching could actually create opportunities and level the playing field for specific categories of coachees or coaches (hearing impaired and other handicapped, discriminated minorities,...). (Clutterbuck, 2010)

## B. Technological tools that create “augmented or virtual reality”

Technological tools, beginning with the polygraph, have the potential to modify the practice of one on one coaching by making new insights available to coaches and by offering new platforms for exchange both to coaches and coachees.

While some virtual reality solutions are being used by practitioners to work with coachees, the most sophisticated tools that could provide the coach with an “augmented reality” are currently not being used in the field of coaching but essentially remain the privilege of national security, forensics and research.

As early as 1984, the National Science Foundation in the United States launched an initiative to give researchers in the areas of psychological, behavioural and cognitive science access to – then - top level computing resources (so-called

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<sup>6</sup> This overview does not present various available specialized platforms on offer for the coaching industry such as eCoach-System, CoachMaster or eCoachPro as they are proprietary and not widely implemented. For details refer to Appendix A (Figure 10: A fairly broad overview of commercially available e-coaching solutions has been published in April 2014

Class VI computers). (Green, 1985) Despite this, little of the R&D work has trickled down into the professional practice of coaching.

## 1. Virtual Reality as a “tool” in coaching

Coaches and therapists are being offered to use virtual reality platforms to work with their clients. One such tool called “ProReal” includes a virtual reality landscape featuring elements of story symbolism such as roads, mountains, a river and a castle.

ProReal builds on the usage of symbolic functions by the coachee: “... mountains represent our higher goals and aspirations while gates signal key moments or rites of passage.” Says one of the developers of ProReal who ponders including more familiar settings such as homes, office space etc. as this would give more “literal space” to the client. On the other hand, this raises the concern that it “would make the unconscious levels of story and metaphor less accessible in a visual form.” (Tinker, 2013)

Virtual reality can also be used to apply therapeutic or coaching tools such as those of the systemic constellations approach. LPS Cocoon has developed and commercialized a concept that can be used both as a physical board game style tool “Systemische Aufstellung face to face” (launched in 2007) and in an online version “Systemische Aufstellung online” (launched in 2008). The physical set is available for sale to professional coaches but it is also offered to end-users for unsupervised use. The online version is offered to be licensed to coaches who are required to be trained by the supplier. These coaches have the possibility to be referenced on the website of the company where coaching clients can choose a coach to work with them, using the tool. (Grabow, 2014)<sup>7</sup>

While such developments appear to be innovative, they don’t necessarily induce fundamental change in the practice of coaching. Software solutions such “ProReal” or “Systemische Aufstellung online” are simply tools in the hands of the coach and the coachee. These programs do not inject any artificial intelligence into the coaching process. They do not supplement, augment or replace the coach in his work. They primarily replace other, physical tools.

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<sup>7</sup> On May 4, 2014, 14 coaches were referenced on the site, including the founding owner of the company



Figure 6: Screenshots from ProReal (ProReal Ltd, 2014) (left) and Systemische Aufstellung (right) (LPS Cocoon, 2014)

But the displacement of the coaching process into “cyber world” is certainly not without consequences and opportunities. Beyond all marketing considerations and the aspects of gimmickry, working in a virtual environment, using an online platform could presumably have favourable consequences that still need to be investigated.

Other than avoiding the constraints of physical presence addressed above, virtual platforms allow users to “try out” things that can be easily undone and free them from potentially blocking constraints such as their inability to move, to draw etc. Furthermore, the aspects related to decentring, disinhibiting and projecting might well offer major potential. “Playing” a scenario in a virtual world can help the coachee to lift barriers, to change perspectives or simply to feel safe. Appealing to gaming skills can re-energize an “inner child” or, on the contrary allow sticking more closely to the habits that impact so much of our digital lives. (Turkle, 2011)

Additionally, the fact that coaching work is carried out (human to human) on a virtual platform, for instance by using avatars, could lower or abolish the perceived barriers between classical one-to-one interaction and the usage of coaching tools.

## 2. Augmented reality for professional use

While scientific research on technology allowing analysing human psychological states and processes has been actively pursued for at least a century, (Bellis, 1997) little or nothing in terms of tools or concepts has trickled down to the field of coaching practice.

Clinical research, national security and law enforcement seem to remain the privileged beneficiaries of technologies that are not easily accessible and do not remain undisputed both from a scientific and an ethical point of view. (Committee to Review the Scientific Evidence on the Polygraph, 2003) (Eriksson & Lacerda, 2007)

Equipment giving the coach insight into the emotions of the coachee is simply not on offer. However technology is being developed to analyse facial micro expressions (Wilton, 2011), to detect emotions in the tone of voice (Eriksson & Lacerda, 2007), to measure stress and uncover deception (Bellis, 1997) and to interpret body language. (Bregler, 2012).

To see what is already feasible today from a technological point of view it suffices to leave the field of civilian applications and coaching and to look at the work done by the Department of Defence of the United States (DoD) in the area of mental health. In 2013, The DoD's National Centre for Telehealth and Technology has launched an app for mobile devices called BioZen that uses wireless sensors to show the user their physical level of relaxation. According to the Centre it is the "first portable, low-cost method for clinicians and patients to use biofeedback in and out of the clinic." (Jimenez & Cooper, 2013) The centre claims that this solution "takes many of the large medical sensors found in a clinic and puts them in the hands of anyone with a smart phone." According to its developers, BioZen shows real-time data from multiple body sensors including electroencephalogram (EEG), electromyography (EMG), galvanic skin response (GSR), electrocardiogram (ECG), respiratory rate, and skin temperature. It can detect "meditative" and "attentive" cognitive states. (cf Appendix A)

Progress in the medical arena, the growth rate of raw computing power (Moore, 1965) together with rapid progress in neurosciences (Advanced Coaching, 2014) and targeted commercial efforts (Microsoft, 2014) are drivers of a future development which remains hard to anticipate. It cannot be ruled out that ethical considerations and concerns about client resistance contribute to inhibiting investment and development in this field.

### C. Technology replacing human intervention in coaching

At least since the development of Eliza (cf: Figure 9: Example of a dialogue between a user and "chatterbot" Eliza. ) half a century ago, (Wallace, 2006) the aspiration of humans has been to develop technology that can replace human

intervention in cognitive work with humans. Given the complexity of the situations to be addressed, artificial intelligence would be required to achieve this goal and to replace the human coach in his one on one work with the coachee.<sup>8</sup>

However, at the current stage of technological development, most of the IT-based coaching solutions available are rather primitive computer applications that hardly exceed the level of sophistication of questionnaire-based methods that have been in use for decades both for scientific and for popular or business usage.

In this section we are going to look at samples of available coaching software and also investigate the question of “blended coaching, i.e. a combined human and “machine” intervention. A few key considerations on the avenues to be explored in the arena of artificial intelligence close this section.

### **1. A large but disappointing offer in the “Appstore”**

A large number of online applications and “apps” for mobile devices such as tablets and “smartphones” has been published in the course of the last decade.

No comprehensive, up-to-date inventory of coaching applications is available. When searching Apple iOS Appstore for apps referenced with the terms “coach” or “coaching”, hundreds of proposals come up.<sup>9</sup> The four top most “relevant” hits for the search term “coach” were as of April 21, 2014: “Fit Brains Trainer”, an app by training company Rosetta Stone to “exercise” the brain, “Coach Guitar”, an app “to learn to play popular songs without music theory”, Chess Pro – with coach”, “PumpUp – Fitness Coach”. Follows a long list of apps focusing mostly on fitness, diet and sports. A ranking by “popularity” rather than be “relevance” shows “Runtastic Squats Trainer” as the top hit, followed by games such as “Goal 2014 – Football Manager.”

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<sup>8</sup> For the purpose of this dissertation we consider that we are in the presence artificial of (or computational) intelligence when a system “does what is appropriate for its circumstances and its goal, it learns from experience and it makes appropriate choices given perceptual limitations and finite computation.” (Poole, et al., 1998)

<sup>9</sup> No practical ways having been identified to reference these apps according to applicable academic standards, they are listed with the complete names under which they were available on the Apple iOS Appstore at the moment of the research.

A search for “coaching” rather than “coach” turns out “Runtastic Six Pack” as the most “relevant” hit, followed by a free app called “International Coaching Academy” that blends the promotion of events and trainings organised by ICA, the Liverpool, UK based company behind the with a list making tool (for personal goals, habits and values) and links to motivational videos by ICA founder John Haynes.

The next most “relevant” hit is “Focal Point Coaching Excellence” which is the point of entry to the eponymous business, selling coaching and other business services and franchising its concepts.<sup>10</sup> Other than a client login and access to a certain number of free articles (with a click-through option to request commercial contact), this free app does not offer any online coaching proposal.

Follow several sports apps, a few online interfaces for existing clients of coaching businesses, a EUR 4,49 app by the French magazine “Psychologies” called “Zéro Stress” orientated on self-help and self-improvement. This app essentially reproduces in a primitively interactive way the “psychological tests” known from lifestyle magazines and recommends for example to “breathe deeply and slowly for one minute”.

An app called “Lifecoaching” provides the user with inspirational quotes such as the rather dull “Do not be too timid and squeamish about your actions. All life is an experiment.” (Ralph Waldo Emerson). It furthermore offers advice on “how to be your own life coach” and other similar topics presented in the form of simple texts available offline. It also features an option to receive a reminder to read the quote of the day or some other text contained in the app. No commercial purpose other than possibly the proposed link towards books available offline is visible.

An app called “Coaching at the End of Life” is perhaps the most perfect example for apps that are actually just access points to non-interactive web content outlining commercial proposals.

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<sup>10</sup> One of the key business proposals of Focal Point seems to be to sell coaching franchises to unemployed “baby boomers”.

### *Experimentation of a “self-coaching” app*

For the purpose of experimentation and demonstration we have tried out “myThinkPal”, one of the most promising apps available on the Apple Appstore in April 2014. The Coaches Training Institute” (CTI) went to market with this smartphone app in 2012, initially only aiming at self-coaching for individuals. (Kimsey-House, 2012)

But two years later, CTI stated: “...this app gives coaches and their clients a way to enhance and deepen their relationship while giving those new to coaching the practical tools to get them started. So now, if you have a smartphone, you have a coach.” The free app includes features such as a “starter set” of “powerful coaching questions” and an “assessment wheel”. Additional content is made available as in-app purchases. (CTI Coactive, 2014)

A self-test by the author of the free version essentially reveals a series of relatively standard coaching questions, such as “What will this look like in a week?”, “What support do you need to accomplish your goals?” and “If you had a magic wand, how would you use it?” The app allows for the user to record his answers as text or audio notes and to review them. There is also a possibility to send the recorded answers by e-mail. There is no sign of any intervention of an algorithm that adjusts program behaviour to user input.

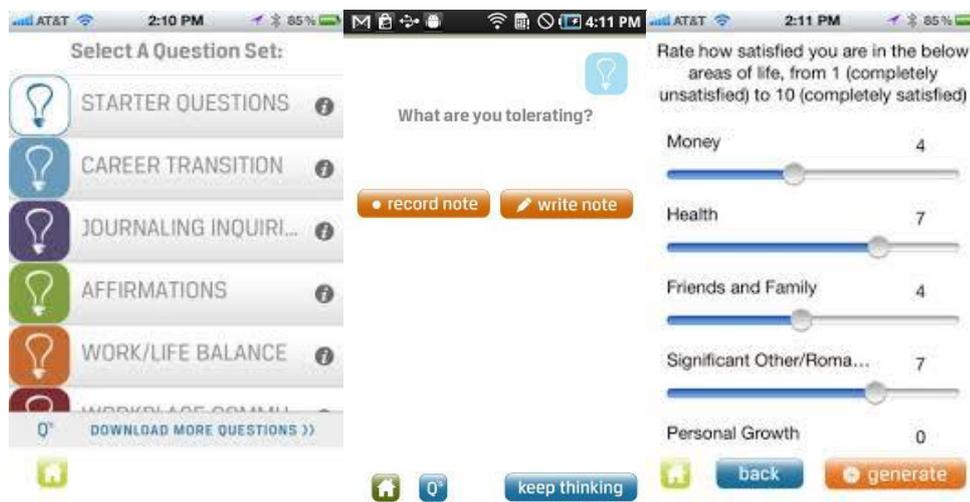


Figure 7: Screenshots from CTI's myThinkPal app (CTI Coactive, 2014)

Even apps that are equipped with algorithms remain extremely primitive, including not more than a handful of “if-then” steps. Very often they resemble self tests that have been available in paper form for many years. The founder of

Behavioural Health Innovation, a company providing advisory services on technology to professionals, states: “The app will not replace the therapist or the coach as many in the change-agent profession fear. ... Apps, like assessments, self-help materials and worksheets, serve as enhancements to the therapy or coaching process.” (Ostrowski, 2013)

While many offerings are available on the app store, some providers such as E-Coach Associates, Inc. (ECA, Inc., 2014) also offer more comprehensive downloadable programs that are to be installed on the computers of users. Robot-coach is a French online service offering for instance a 30-day subscription in the context of which “a virtual coach is assigned” to the coachee. Up to three times a day, the software sends a series of evaluations, tests and exercises to the client who accomplishes the assigned tasks. An online evaluation concludes the program invoiced EUR 90. (i-DCP, 2011).

While the number of small players abounds, major companies such as IBM, the parent of IT-superbrain subsidiary Watson Group are increasingly dynamic and gobble up technology start-ups such as Welltok (Ravindranath, 2014) which in turn acquire smaller specialized players such as Mindbloom, the developer of a self-improvement game. (Cook, 2011), injecting capital and making raw computing power available.

## **2. Blended coaching on the rise**

Patterns as the one described above position IT-coaching tools more as a supplement than as a replacement of human intervention in coaching. Blended coaching has been defined as a coaching relationship “including at least one face-to-face session in addition to other modalities.” While solutions available today “do not change the essential process of effective coaching” ... “they allow more versatility when working with coachees over distance and time.” (Pulley, 2006)

Business solutions have been developed for use in the field of coaching and end-users are interested. According to a study carried out with 300 e-coaching users in the US and Europe, 76.4% of the users claim that e-coaching will allow them to “handle a work-related situation successfully”. (Ahrend, et al., 2010). Other research confirms growing acceptance of e-coaching on the side of the coaches. (Otte, et al., 2014)

The work done by the US Department of Defence in the area of mental health is indicative of the potential such an approach carries. (The National Centre for Telehealth and Technology, 2014) (cf appendix A)

In 2011, the Centre for Creative Leadership, a US-based business training institute designed a blended coaching process for a large multinational company aiming at developing their future leadership base. (Pulley, 2006) The process is comprehensive representation of the possibilities offered by well accepted, mainstream tool and includes asynchronous and synchronous elements, involving humans as well as computerized response. Part of the synchronous human to human interaction was conducted in a context of physical presence while other elements were carried out at a distance. CTI, the developers of myThinkPal even offer coaches to build their own app for blended coaching, using the technology platform of CTI. (CTI Coactive, 2014)

**FIGURE 13.1. BLENDED COACHING SOLUTION FOR A GLOBAL ORGANIZATION.**

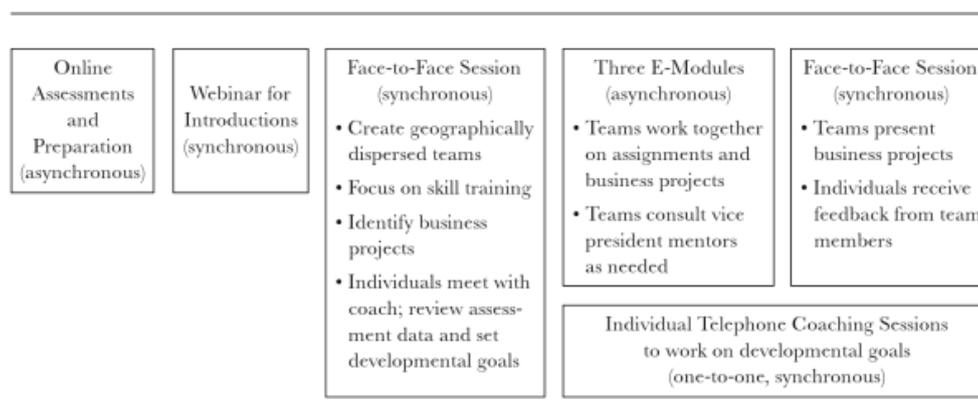


Figure 8: Example of a structured blended coaching program (Pulley, 2006)

Specialized operators have been offering blended coaching services built around licensed coaches for some time. A service named “Virtual Coaching“ adopts a 2-step methodology: First, the user is guided through an internet program and is asked to respond in writing to a series of questions. In a second step, the internet-based self-coaching is accompanied by a personal coach via telephone or face to face. (Geissler, 2014).

Businesses or professionals active in providing learning services are often able to position themselves favourably to propose integrated IT solutions that can combine learning and coaching. Sometimes coaching is positioned as a mere accompanying element of learning but it can also take the shape of a more complete and complex offer such as with Coachline (Natural Performance Group, 2014).

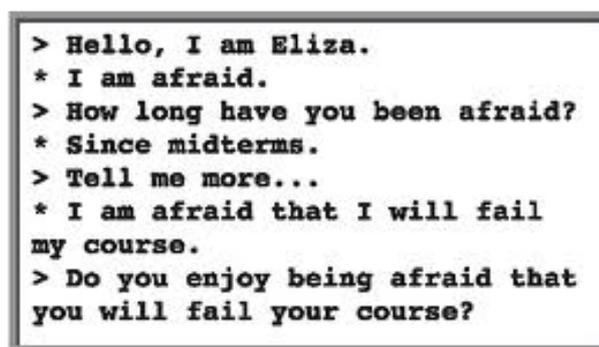
Estimates indicate that demand is to grow significantly for e-coaching applications as well as for in-person services. (United States Department of Labour, 2013) (Kanna & Khanna, 2012).

Large businesses such as Kenexa Corporation, a subsidiary of IBM position themselves to become integrated suppliers of technological platforms and coaching expertise. (Littlefield & Mage, 2012).

### 3. Artificial Intelligence?

SIRI, the present day virtual “executive assistant” from Apple (Bosker, 2013) is in a certain way the grand-daughter of ELIZA, a computer-based Rogerian psychotherapist (Wallace, 2006) that was developed 50 years ago. SIRI’s quite frustrating performance and relative lack of success (Miller & Shaheen, 2014) are a good indication that at this stage commercially available AI (artificial intelligence) solutions have not reached the stage of maturity.

Equally, so-called “e-coaching” solutions would probably fail a somehow demanding Turing Test (Turing, 1950) applied to coaching practices despite the massive increase in computing power.



```
> Hello, I am Eliza.  
* I am afraid.  
> How long have you been afraid?  
* Since midterms.  
> Tell me more...  
* I am afraid that I will fail  
my course.  
> Do you enjoy being afraid that  
you will fail your course?
```

Figure 9: Example of a dialogue between a user and “chatterbot” Eliza. (Barrons, 2006)

More importantly still, none of the solutions reviewed in the previous section would qualify as artificial intelligence as defined (Poole, et al., 1998) as their performance is strictly limited to the execution of explicitly pre-programmed sequences (Kamphorst & Kalis, 2014).

While technological progress in this area should logically develop in parallel with the growth of computing power (Moore, 1965), the emerging scenario is that even if AI is to appear in the field of coaching, the likely scenario is that of “blended coaching”, i.e. an integration of computer-based coaching tools into a coaching process designed and driven by a human coach, leading to his partial rather than total replacement.

Businesses such as Cognea aggressively tout the “unprecedented speed” of their solutions but don’t really offer applications going beyond the complexity of smartphone-based “health coach” or “home butler” apps. (Cognea AI, 2013)

However, interesting but tentative developments such as MACH, a virtual agent that captures facial expressions, speech, and prosody and responds with verbal and nonverbal behaviours in real time appear in university labs and should be monitored further. (M. E. Hoque, 2013) (Biomimetics and Intelligent Systems Group, 2014)

In the longer run, scientific progress could offer radically new perspectives for the interaction between man and machine if the models on which thinking and research in both the fields of neuroscience and artificial intelligence are based change.

Much of the currently prevailing thinking in neurosciences is limiting with regard to the development of AI: “We think of the brain as a glorified sausage machine, taking in information from the senses, processing it and regurgitating it in a different form, as thoughts or actions. The digital computer reinforces this idea because it is quite explicitly a machine that does to information what a sausage machine does to pork. Indeed, the brain was the original inspiration and metaphor for the development of the digital computer, and early computers were often described as 'giant brains'. (Grand, 2003)

On the other hand, R&D work on artificial intelligence is confronted to a paradigm shift: The traditional approach was to consider the human mind as the model to develop AI: “It is scarcely conceivable that scientists could be engaged in

developing the ideas that will make it possible for machines to emulate minds without wondering whether these ideas would explain their own minds as well.” (Turkle, 2005)

Recent research in the field of man-machine integration could be offering new perspectives in this context: “Current models for human-machine integration are based on symbolic or computational cognitive science and related disciplines. Even though they use experimental and clinical data, they are yet based on logical, linguistic and computational interpretative frameworks of human nature. Augmented human design needs an integrative theory that takes into account the specificity of the biological organization of living systems, according to the principles of physics, and a coherent way to organize and integrate structural and functional artificial elements.” (Fass, 2012)

A fundamental change is hence required in artificial intelligence to perform a “shift from a metaphorical and scenario-based design, grounded on metaphysical models and rules of interaction and cognition, to predictive science and engineering of interaction and integration. (Fass, 2012)

## Conclusion

Recent research shows that technology has significantly impacted traditional face-to-face social practice and “has dramatically changed” the nature of professional relationships. (Mishna, et al., 2012) “The overwhelming finding was that technology and cyber-communication has not only “crept” into traditional work practices but indeed signifies a turning point.” (Mishna, et al., 2012). (Cox & Dahanny, 2005). In practice areas adjacent to coaching, including for instance the therapeutic field, virtual reality and “self-help” software is already making forays (Williams, 2013) and large companies are showing interest.

After reviewing these changes in the technological, social and scientific environment of coaching, a broad categorization of drivers of change in the potential and effective practices can be established:

1. The most broadly observed phenomenon is certainly the **emergence of communication technologies that allow going beyond face to face coaching**. Communication technologies, starting with the telephone, tend to facilitate the practice of one on one coaching work, essentially by lifting or easing physical boundaries and the associated costs of face to face coaching.

The use of communication technologies essentially **expands** the geographic reach and enhances the productivity in the coaching **relationship without changing the practice**. Additionally it aligns the practice of coaching on changes observed in the entire arena of professional services as well as in society in a broader sense.

2. A second major category is that of technological tools that create “**augmented or virtual reality**” available for the coach alone or for both coach and coachee. Such tools, beginning with the polygraph, have the potential to modify the practice of one on one coaching by making new insights available to coaches and by offering new platforms for exchange to coachees and coaches.

Some virtual reality solutions are being used by practitioners to work with coachees, creating new platforms for projective work. But the most sophisticated and ethically controversial tools that could provide the

coach with an “augmented reality” are currently not available in the field of coaching, remaining in essence the privilege of actors that are more concentrated and better resourced such as national security, forensics and research.

Developments in this category have the potential to **modify** the position of the **coachee** and/or the perception the coach has of the coachee. However at this stage, practical applications in field of coaching remain rare.

3. The third category is that of technology that impacts the position of the **coach** and could **partially or completely replace human intervention** in coaching.

At the current stage of technological development, the stand-alone machine-based coaching solutions available are rather primitive computer applications.

While technological progress in this area can develop in parallel with the growth of computing power (Moore, 1965), the emerging scenario is that of “blended coaching”, i.e. an integration of technology-based coaching tools into a coaching process designed and driven by a human coach, leading to his partial rather than total replacement.

The pace of progress in information technology, neurosciences and artificial intelligence and the scale of capital investment will be dictating the rate of change in the field of coaching.

RoboCoach may only seem a spectre but coaching has definitely entered into the technological age. This evolution allows the practice to keep pace with changes in society.

- Certain developments, for instance in the area of distance coaching, are necessary adaptations to be made rather than new opportunities to be seized.
- In other areas such as enhanced reality, coaching is lagging behind other applicative practices.

- Artificial intelligence building on the insights of neurosciences could radically change the game.
- But the greatest medium term potential for a qualitative change in the practice of coaching lies probably in the development of concepts of blended coaching that combine human-human interaction with the use of computer programs.

At this stage we cannot say whether the robot will replace the human coach. Or at least we cannot say when it will do so. The question that is more immediately relevant is however: how is the robot changing coaching? Will the acceleration of time (Rosa, 2005) push towards an increased demand for instantaneous and ubiquitous coaching solutions? Will an extremely fragmented industry be transformed by the probable appearance of capital-intensive integrative and normative processes of “blended coaching”? (Schipperheijn & Poepse, 2014) Will the diverse biosphere of coaching be pushed as a consequence in the direction of a concentration of standardized practices carried out by “normed” coaches complying with the standards of oligopolistic vendors of blended coaching solutions?

Does “blended coaching” project the professional practice into a system in which “everything communicates”, as Lucien Sfez would put it, and where it becomes impossible to know whether man or the machine is the emitter or the receiver? “Tautism”, a contraction of tautology and autism is the neologism coined by Sfez to describe this state of affairs which he also likens to a “communicational Frankenstein”, i.e. to a monster escaping from the control of its creator, becoming both independent and indifferentiable from its human originator. (Sfez, 1988)

Maybe we are not there (yet). The praxis of technology-based coaching we can observe today and anticipate for the near and medium term future is not so much evoking an artificial “Frankencoach” than a RoboCoach who, like RoboCop<sup>11</sup> is not an android but a cyborg struggling with the contradictions between his human soul and corporate programming. Maybe, as in the RoboCop movie, we shall see free will prevail.

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<sup>11</sup> In Paul Verhoeven's 1987 movie, RoboCop is an experimental cyborg created by OmniConsumerProducts (OCP) after the company's ED-enforcement android kills a person during a demonstration. The company then arranges for a police officer to be killed in the line of duty in order to have material to build the cyborg prototype.

# Appendixes

## Appendix A

### **Work done by the US Department of Defence on blended app-based solutions**

The US military is developing and making available a host of quite sophisticated apps to be used in the field of “behavioural health”. (The National Centre for Telehealth and Technology, 2014)

The volume and the concentration of resources and the need to be able to urgently support a large population of service members in very difficult psychological conditions favour this leadership position of the Defence. An additional key factor is without doubt the fact that the military can ensure a precisely defined and engineered interfacing between app-based processes and the intervention of professionals. Civilian applications in the field of coaching are comparatively unsophisticated, if not outright primitive in comparison.

According to the Centre, the geographic dispersion of beneficiaries creates challenges for the Military Health System in providing behavioural health care. Telehealth provides opportunities to not only leverage Department of Defence health provider resources and increase access to care through information and telecommunication technologies, but also to cultivate new, more efficient methods of care delivery. (The National Centre for Telehealth and Technology, 2014)

These military solutions have not been reviewed or tried in detail by the author as key components are unavailable to the general public. Furthermore it should be noted that these tools are not necessarily designed for being used in a coaching practice but rather target the therapeutic field.

## Appendix B

### Overview of commercially available e-coaching solutions

	1. Function	2. Communication channel	3. Synchronicity	4. Feature complexity	5. Industry focus	6. Content creation (coach)
<b>CAI</b>	Basic communication with support tools	Visual & text	Synchronous & asynchronous	Conglomerate	Coaching specific	Pre-defined / User-generated
<b>Covocative</b>	Basic communication	Text	Synchronous & asynchronous	Conglomerate	Coaching specific	Pre-defined/ User-generated
<b>Virtual Coaching VC</b>	Support tool	Text	Synchronous & asynchronous	Point	Coaching specific	Pre-defined
<b>eCoachSystem</b>	Basic communication	Text	Asynchronous mode	Point	Coaching specific	Pre-defined
<b>ProReal</b>	Support tool	Visual	Synchronous & asynchronous	Point	Coaching specific	Pre-defined
<b>LPS Cocoon</b>	Support tool	Visual	Synchronous mode	Point	Coaching specific	Pre-defined
<b>CoachingSpaces</b>	Support tool	Visual	Synchronous & asynchronous	Point	Coaching specific	Pre-defined
<b>CoachMaster</b>	Basic communication/Support tool	Text	Synchronous & asynchronous	Point	Coaching specific	Pre-defined / User-generated
<b>JournalEngine</b>	Basic communication	Text	Asynchronous mode	Conglomerate	Coaching specific	User-generated
<b>CoachCampus</b>	Basic communication	Text	Synchronous & asynchronous	Conglomerate	Coaching specific	User-generated
<b>CoachingCloud</b>	Basic communication with support tools	Text	Synchronous & asynchronous	Conglomerate	Coaching specific	User-generated
<b>CoachAccountable</b>	Support tool	Text	Asynchronous mode	Conglomerate	Coaching specific	User-generated
<b>The Coaching Tools Company</b>	Support tool	Text	Asynchronous mode	Point	Coaching specific	Pre-defined
<b>Lifecoachhub</b>	Basic communication / Support tool	Text	Asynchronous mode	Conglomerate	Coaching specific	User-generated
<b>The LearnScape</b>	Basic communication with support tools	Text	Asynchronous mode	Conglomerate	Coaching specific	Pre-defined/ User-generated
<b>JigsawBox</b>	Basic communication with support tools	Text	Asynchronous mode	Conglomerate	Coaching specific	User-generated
<b>TheCoachingApp</b>	Support tool	Text	Asynchronous mode	Point	Coaching specific	Pre-defined
<b>Beyond Expectations App</b>	Support tool	Text	Asynchronous mode	Point	Coaching specific	Pre-defined
<b>Breeth App</b>	Support tool	Text	Asynchronous mode	Point	Coaching specific	Pre-defined

Figure 10: A fairly broad overview of commercially available e-coaching solutions has been published in April 2014 (Kanatouri, 2014)

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