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## Employing Augmented Reality for EFL Textbook Development, Instruction, and Learning

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### Introduction

In many EFL classrooms around the world, teachers use printed textbooks and ancillary print-based or electronic resources to promote student learning and achievement (see TOMLINSON 2008, <sup>2</sup>2011, <sup>2</sup>2013; KURTZ 2010, 2011; McGRATH 2013, <sup>2</sup>2016; KOENIG 2013; NIEHAUS / STOLETZKI, / FUCHS / AHLRICHS 2014; HARWOOD 2010, 2014; RICHARDS 2015). Most of these resources and materials are produced and provided by an oligopoly of globally or regionally engaged educational publishers, in accordance with their core business aims and objectives (see, for instance, KURTZ 2002; JOBRACK 2012; FUNK 2013, GRAY 2013).

EFL textbook publishing is a highly competitive and profitable industry. Research conducted in academic disciplines, such as applied linguistics, second language acquisition (SLA), and foreign language pedagogy, including German *Fremdsprachendidaktik* and *Sprachlehrforschung* (for brief overviews see, respectively, DOFF 2017; KÖNIGS 2017), is undoubtedly of great importance to all publishers, but (as it seems) mainly in terms of business utilization and valorization. This becomes most evident in textbook promotion catalogues in which publishers typically claim that their products are reflective of the latest research findings and technologies, and in which they address teachers in a way that suggests that (only) their bought-in, supposedly 'cutting-edge' expertise can 'guarantee' adequate student learning and achievement (from a German perspective, see KURTZ 2002). However, as a considerable body of textbook evaluation

research indicates, most EFL textbooks and accompanying print and electronic resources world-wide are based on a more or less convincing compromise between traditional, largely language structure-oriented, and in parts more innovative, task-oriented and culture-sensitive approaches to foreign language instruction and learning (see, for instance, KURTZ 2011, 2014; THALER 2011; MCCONACHY/HATA 2013; GARTON/GRAVES 2014a; FÄCKE/MEHLMAUER-LARCHER 2017).

In her personal, behind-the-scenes look at educational publishing in the United States, JOBRACK (2012) explains why this is the case and why commercially motivated eclecticism, which is not to be confused with instructional pragmatism or 'balanced teaching' in EFL classroom contexts (see THALER 2010), constitutes a problem:

Publishers ensure that a [textbook] program addresses all concerns, all trends and all approaches so every customer will find something they like [...]. The inclusion of all instructional approaches and philosophies, however, is almost the same as having no philosophy or approach. [...] Because marketing departments argue that teachers will not purchase programs that are too different from what they are currently using, today's major publishers find well-established authors to contribute to a program, but often minimize their contributions in order to promote marketing concerns over research and effectiveness. The result is that their major programs have no vision or consistent philosophy that will motivate teachers and students (JOBRACK 2012: 37; for an extensive discussion of the value of principled frameworks for materials development, see TOMLINSON <sup>2</sup>2013).

In order to dominate market share, reduce costs and risks, and maximize profit, today's leading educational publishers have embarked on a business strategy that aims to provide teachers and students with bundled textbook packages which comprise a huge assortment of print-based and electronic materials and resources. Bundled EFL packages typically include: textbooks and workbooks for use in the classroom or at home, supplemental audio, visual, and audiovisual media, grammar and vocabulary practice resources, test or exam materials, student self-evaluation guides, grids, and portfolios, printed teacher manuals, complex electronic classroom management and lesson planning tools, e-textbooks and e-workbooks designed for use with interactive whiteboards, and, increasingly, a range of free or subscription-based online resources. In light of this, JOBRACK (2012: 40) remarks: "Today's programs have grown astronomically large with an overwhelming number of features and components". Yet, leading educational publishers still conceive of and sell the printed textbook as the core learning and teaching resource (see LITTLEJOHN <sup>2</sup>2011; from a German perspective, see HAß 2016; NIEWELER 2017; for a critical look at the textbook as the core medium for foreign language instruction, see SCHMELTER 2011).

In accordance with this, JOBRACK (see 2012: 34) claims that a 'print-first'-strategy is still central to most US textbook publishers' business models. However, in view of the dramatic increase in ancillary print-based and electronic resources and materials made available by EFL publishers worldwide, it seems to be more adequate to speak of a print-centered maximization strategy in this particular context, designed to retain and further gain as much market share as possible by offering teachers a wide variety of 'all-from-one-hand'-resources and materials built around the printed EFL textbook (focusing on EFL textbook production and marketing in Germany, see KURTZ 2002, 2014).

JOBRAK (2012: 39) also posits that if one educational publisher extends its product portfolio, other publishers will soon follow suit: "To command market share, [...] companies believe that they must duplicate features and components that other successful programs have". Nevertheless, many teachers seem to be hesitant to shift to textbook programs produced by other publishers. This appears to be particularly true for textbook programs "that offer teachers greater convenience and the most resources while at the same time not requiring that teachers change their practices" (2012: 34).

Standards-driven education policies which focus on measurable outcome and on nationwide, standardized testing and comparability seem to affect textbook development and innovation in further (questionable) ways (see, for instance, OELKERS 2010). As JOBRAK (2012: 3) argues, "[i]f a curriculum must meet all the standards before it will be considered by a state for adoption [...], educational publishers have no incentive to create materials for which there are no standards. Resources and materials that do not address specific standards will not sell."

With regard to the current state of educational textbook publishing in today's digital world, JOBRAK (2012: 129) concludes that "publishers are ingrained in old media, are risk averse, and debate irrelevant issues, as the world is passing them by." In sum, she speaks of "a monolithic industry that stifles innovation, squashes competition, drastically limits choice, and creates a risk-averse development process that at best perpetuates the status quo" (2012: 25).

Viewing the educational textbook industry from this rather subjective and, as such, perhaps, all too negative perspective (see FUNK 2013), it comes as no surprise that publishers are facing increasing competition from internationally operating personal computer companies, software developers, and digital content providers today, especially from those who offer customizable, interactive learning and teaching resources, aids, and tools designed for use with portable electronic devices. Still, up to now it is unclear what impact these emerging competitors and the new technologies they bring to market will have on next-generation EFL textbook development, publishing, and consumption in and beyond the classroom.

Starting from here, this paper addresses some fundamental issues concerning future EFL textbook development and use. Special attention is given to questions concerning the pedagogical conceptualization and design of language learning and teaching in the digital age, including notions of learning place and space, of multimodality, interactivity, and hybridity, and, last but not least, of task-driven and differentiated instruction. Considering the rapid advances in (mobile) information and communication technology (ICT), the paper focuses on the potential and limitations of one particular option in textbook development and production which has been referred to in recent studies as 'AR-enhanced materials design for language learning' (see HAWKINSON 2014; GOLLA/KURTZ 2016, GOODWIN-JONES 2016).

## **1 Framing problems**

In international EFL textbook research, relatively little attention has been given so far to questions concerning the future of bundled, largely print-centered learning and teaching resources and materials. Studies investigating what strategies educational

publishers pursue to meet the manifold challenges and opportunities emerging from advances in ICT, in applied linguistics, in SLA research, and in foreign language pedagogy are exceedingly rare and typically based on personal, and, as such, anecdotal experience and (inside) knowledge. In general, much of what is known about the strategic goals, business models, and selling propositions of the EFL educational publishing industry is vague.

Apart from this, there is little empirical classroom research available at present revealing how EFL teachers and learners actually use existing textbooks and ancillary print-based and electronic materials and media in order to promote learning and student achievement. As SERCU (2004: 626) points out in the first edition of the Routledge Encyclopedia of Language Teaching and Learning,

[a]s yet, there is no universally recognized theory of the textbook. Empirically, too little is known about how and when teachers use textbooks; how textbooks influence the learning process in comparison with other instructional materials; what research instruments are most reliable in the field of textbook research; how visual materials influence the learning process; how effective textbooks are in transmitting knowledge or promoting the acquisition of independent learning skills, to give but a few examples.

More than a decade later, textbook use by teachers and learners is still one of the least explored and understood areas of EFL classroom research (see GARTON/GRAVES 2014b; MARCOS MIGUEL 2015; ZHANG 2017). There is also a substantial knowledge gap concerning the actual impact of the ongoing digital revolution on teachers' and learners' attitudes toward adopting ICT in EFL classrooms, including aspects such as perceived usefulness and adaptability, perceived functional complexity and ease of use, expectancy of effort, perceived quality of incorporation conditions, potential barriers to instruction, and recognized surplus value.

Ultimately, little is currently known about what approach to EFL teacher education is or may turn out to be most effective and efficient with regard to preparing pre-service and in-service teachers for the complex challenges and opportunities of instruction and learning in the digital age (see PEGRUM 2014: 188ff.). In sum, there is a strong need for further research in all of the areas mentioned above.

## **2 Outlining challenges**

In view of the unsatisfactory status quo of EFL textbook research and the vagueness and subjectivity of knowledge about textbook development, publishing and, above all, textbook consumption by EFL learners and teachers in and beyond the classroom, it is quite difficult to craft a vision of the textbook (in terms of its future form and function). Nevertheless, adopting a forward-looking view to EFL textbook development and use, including theoretically useful or promising electronic technologies and media, is essential for framing future-minded research questions and projects. Such exploratory and anticipatory research should not be dismissed as crystal gazing, simply because it is largely hypothetical in nature. If conducted in a careful manner, taking a multitude of perspectives, constraints and affordances into consideration, it can spark new ideas,

open gateways to further research, inspire innovative theories and contribute to developing practices that are more adequate, enriching, and (perhaps) effective.

As research on teacher cognition in language teaching implies (see BORG 2003), proposals for radical, largely discontinuous change, including, for instance, MEDDINGS/THORNBURY's (2009) conceptualization of a so-called pedagogy of bare essentials (also known as 'Dogme', or referred to as 'unplugged', 'materials-light' teaching and learning), are (arguably) difficult to integrate into teachers' personal beliefs and their largely experience-based views about what instruction in EFL classrooms should be like. Radical, textbook-averse proposals are likely to raise EFL teachers' personal concerns and worries regarding their personal competence and capability to meet the demands and expectations of standards-based, measurable, and outcome-oriented instruction and learning. For educational publishers, 'unplugged' teaching constitutes a serious threat to their business (for a discussion of teaching without a textbook from a German perspective, see FREUDENSTEIN 2001; VENCES/FREUDENSTEIN 2002).

However, in this respect, it is important to note that dichotomizing change in terms of radical/gradual is far too simplistic to address the complexity of challenges and demands associated with instruction and learning in today's digital world. In view of the rapid pace of change in (mobile) ICT in recent years, and the comparably slow tempo of change in textbook development and in everyday instruction in schools (with regard to aspects of gender sensitivity in EFL textbooks, see, for instance, BENITT/KURTZ 2016), it appears to be much more suitable to frame challenges in terms of incongruities stemming from different paces of development and change in ICT, in textbook production, and in the praxis of teaching and learning.

In recent years, a few studies have examined such incongruities in more detail, referring to them as critical mismatches or disconnects. For instance, adopting an English for Speakers of Other Languages (ESOL) and English for Academic Purposes (EAP) perspective, looking at adult English language learners and informal contexts of learning in particular, KUKULSKA-HULME/NORRIS/DONOHUE (2015: 5) argue that "[t]here is a disconnect between this world of language education and the multimodal text processing and creation that learners engage in and beyond the classroom, where they may, for example, share video clips on social media which interweave words, sound and image (photography, graphics and film)." However, in their ELT research paper on mobile pedagogy for English language teaching, the authors do not raise any questions concerning the future of the print-based textbook and its use in and beyond the classroom. Obviously, their approach to digitally-assisted language learning is also rather radical and as such quite difficult to bring in line with current, largely textbook-centered ways of teaching EFL in primary and secondary school contexts (see the summary graphic included in KUKULSKA-HULME/NORRIS/DONOHUE (2015: 8) and, furthermore, KUKULSKA-HULME's critical appraisal of mobile assistance in language learning (2016), which focuses entirely on informal learning contexts).

Looking at teachers' perceptions of the potential and usefulness of electronic media in Dutch primary schools, WESTDIJK (2016) reports on some further mismatches, especially between educational publishers' products and individual teachers' wishes and needs. In her qualitative-empirical case study, she points out that electronic offline and

online resources developed by educational publishers today are perceived as having few advantages over printed textbooks and accompanying materials:

A complaint that was often heard from the teachers is that there is too little digital material available that is good enough to replace the books: 'Digital material is often just a scanned book, so why should I use that, instead of a book? I can always use a book, because it does not have any technical complications. Digital material does not really add something now.' That the perceived quality of digital education materials is low, means the performance expectancy is also low (WESTDIJK 2016: 55).

Based on supplementary interviews with Dutch education publishers, WESTDIJK (2016) also refers to mismatches between textbook publishers' assumptions regarding Dutch primary school teachers' IT-competence in general, and individual teachers' perceived expertise and skills in using electronic resources and materials in the classroom. Furthermore, her study raises some important questions as to who is ultimately responsible for change (teachers, researchers, curriculum designers, textbook publishers, school boards, or policy makers?).

Focusing on the effects of technological change on the teaching profession in general, MOMINÓ (2015: 6), in his UNESCO background paper for discussing the implications of technological change on the teaching profession, contends that "[t]eachers nearly always find it easier to incorporate technologies into their teaching methods (rather than altering the latter) than to ignore implicit convictions and risk implementing alternative teaching strategies." Adopting a broad educational perspective, he concludes: "Several decades of sustained investment in schools' technological resources and the trend towards universal Internet access have not resulted in enough tangible evidence that the general change needed has happened."

If radical, discontinuous change is rather unrealistic or at least difficult to implement, how is gradual change in terms of a continuous, sustainable transformation of instructional resources and practices possible? What role can (mobile) ICT play in transforming and enhancing EFL classroom practices and learning?

### **3 Articulating choices**

The following thoughts and reflections are grounded in the assumption that market-leading educational publishers will not readily abandon their 'play-it-safe'-business models that have been successful and profitable over many decades. Since print-centered, bundled textbook packages still constitute the main source of their income and profit, it would be unrealistic to develop a theory of EFL textbook development and use that runs counter to past and present business strategies. In view of the long history of textbook-driven foreign language education in schools (see, for instance, from a German perspective, SAUER 1964; PIEPHO 1989; NOLD 1998; BRILL 2005; KOENIG 2013; NIEWELER 2017), it would also be rather naïve to assume that EFL teachers are willing to radically change their views of how instruction works best in the classroom. In sum, it appears to be more reasonable and realistic to conceptualize future EFL learning and teaching in terms of gradual (continuous) rather than radical (discontinuous)

change, trying to preserve what is (widely) accepted in theory and what has turned out to be feasible and most useful in practice, while at the same time looking out for opportunities for improvement (for a problematization of theoretical consensus and acceptance in this area, see ZHANG 2017). In this context, it seems to be sensible to think of a bridging technology that is capable of reconciling traditional, largely print-based and grammar-oriented formats of instruction with more innovative language pedagogical approaches and designs, utilizing digital media applications wherever pedagogically appropriate and technologically possible. Augmented reality (AR) can provide such a bridge.

#### **4 Defining AR**

It is beyond the scope of this paper (as well as my personal knowledge and expertise) to discuss AR in all its technological details, varieties, and manifestations. Looking at AR as a potentially useful media technology, the focus will be on hand-held, camera-based display applications, rather than on eye-worn or projector-based solutions (including 'spatial AR' and holographic imagery), acknowledging that the latter may, perhaps, be even more powerful for creating meaningful, attractive, and effective EFL learning environments in the future (for a discussion of the technological and pedagogical potential of 'spatial AR' see, for instance, CHURCHILL 2017: 228ff.); for a brief overview of different types of AR, see HAWKINSON 2014).

In essence, AR is conceived of here as a digital media technology designed to enrich and, ultimately, enhance its users' perception and experience of, as well as their interaction with, the perceived physical world. AR superimposes digital information (for instance, photorealistic 2D or 3D graphics, animations, audio or video content, written or spoken text) upon a certain physical surrounding, object or situation (for instance, a city square, a building, a room, or the page of a book). As such, it supplements the users' view of the physical world, rather than replacing it completely. By overlaying digital information on the physical background, the physical (material) and the digital (immaterial) world appear to coexist at the same time, but the users can still tell them apart. This distinguishes AR from virtual reality (VR) which creates a computer-generated, synthetic environment in which the user is completely immersed. Contrary to VR, AR aims to make the perceived physical world more easily accessible and meaningful. The central idea is to offer a more profound, 'hybrid' perception and experience of the physical world through technological enrichment (see the seminal paper by AZUMA 1997 and BILLINGHURST/KATO/POUPYREV's (2001) pioneering work on the 'Magic Book'; for an extensive overview of AR in theory and in practice, see MEHLER-BICHER/STEIGER<sup>2</sup>2014). From a foreign language educational perspective, AR can be viewed as a context-sensitive multimedia technology, which is eminently suited for language and culture learning in context-sensitive, communicative settings in and beyond the EFL classroom.

## **4.1 Outlining research on AR in educational settings**

Over the past years, there has been increasing research interest in incorporating AR in education. As the state of the art reviews by VAN KREVELEN/POELMAN (2010), YUEN et al. (2011), WU et al. (2013), CABERO/BARROSO (2016) and CHEN et al. (2017) indicate, AR is a highly versatile and flexible media technology which holds great potential for enriching and, perhaps, enhancing learning and teaching in various educational contexts. This is largely due to its capacity to modify its users' perception of the physical world by adding, hiding, highlighting or modifying certain pieces of perceptual information relevant to learning and instruction. If used in combination with portable devices such as smartphones or tablets, AR could provide a powerful technological platform for a broad range of pedagogical approaches and instructional formats, including task-driven, differentiated instruction and learning inside and outside the classroom.

However, as CABERO/BARROSO (2016: 47) point out, most of the research on AR in education has been conducted in laboratory contexts rather than in real education contexts so far, and "a stronger emphasis has been laid on technological and instrumental approaches than on research initiatives focused on analyzing its educational possibilities." In sum, CABERO/BARROSO identify "a clear lack of scientific research works and studies about the potential which AR can supply to training and the roles that teachers as well as students can play in that process." (ibid.). Correspondingly, CHEN et al. (2017: 16) argue that "more studies need to be undertaken considering the difference of cognitive process and psychological immersion between AR and reality settings; the individual interaction, sense of identity, and adaptive application in augmented reality; AR classroom design and evaluation research; the teacher's role model in AR educational setting; designing and implicating learning resources of AR in k-12."

## **4.2 Examining AR for language learning and instruction in school contexts**

The most important questions emerging from the current state of research are: Where and when does it really make sense to use AR? Anywhere and anytime? What is desirable or necessary? What aims and objectives of teaching and learning languages can AR serve best? What uses of AR are most convincing to teach languages more effectively and efficiently? How does AR change the way teachers teach and learners learn languages? In sum, what is the potential surplus value of using AR in language education? The present paper cannot and does not attempt to address all of these questions. Future research will have to examine the language pedagogical potential and impact of AR in more detail.

In his state of the art-paper on AR-assisted foreign or second language learning and teaching in various contexts, GODWIN-JONES (2016) identifies four emerging research trends:

- AR for digitally enhanced, place-based language learning
- AR for game-based language learning/the gamification of learning
- AR for inter-/transcultural education and learning, and
- AR for designing hybrid (print, digital) learning environments.



As GODWIN-JONES (2016) points out, there is a growing body of international research dedicated to promoting second (and foreign) language learning by employing AR in out-of-class scenarios. In this research context, AR is conceived of as a powerful vehicle or tool for creating augmented tours, or place-based, and often also game-based, interactive learning experiences (see, for instance, HOLDEN/SYKES 2011; THORNE/HELLERMAN/JONES/ LESTER 2015, the 'Mentira'-project at <http://www.mentira.org>; KUKULSKA-HULME 2016, the 'Maseltov'-project at <http://www.maseltov.eu>). As Hawkinson (see 2014: 158) points out, these kinds of AR applications typically require users to move from location to location performing context-sensitive tasks. Most studies in this research category tend to adopt a radical change perspective (in terms of minimizing the role of printed language learning and teaching resources), focusing on informal AR-supported, out-of-class learning contexts primarily.

Very little (if any) research has been carried out to date to examine AR-enhanced textbook design for learning and teaching English as a foreign language (marker-based, 'print AR'). In 'print AR', the printed textbook is used as a trigger to overlay digital content that can serve many functions, ranging from providing audio-visual annotations (e.g. translations, animations, sound clips, grammar and vocabulary explanations) and tasks of various kinds (especially 'real-world' communicative tasks) to more flexible ways of guidance and adaptive assistance as needed by individual learners (see, for instance, HAWKINSON 2014, GOLLA/KURTZ 2016). This approach is less radical because it does not require teachers to abandon the textbook (which teachers typically view as the core curriculum to be enacted; see, for instance, RICHARDS 2015). However, its potential for transforming and enhancing textbook-driven instruction in EFL classrooms is not to be underestimated:

As the demand for printed media wanes and digital media becoming the norm, print media companies have started turning to AR to create a bridge between print and digital media. Newspapers, magazines and billboards are loaded with marker or trigger images that mobile devices with camera tracking AR applications can augment with audio, video and other interactive content from the web. Teachers can now use this same concept for textbooks. Take an image in a textbook, perhaps an illustration of a historical figure and a student can see video and hear commentary about that figure from their mobile device (HAWKINSON 2014: 158).

## **5 Laying a foundation for AR-assisted EFL textbook development and use**

AR changes the way learners perceive and interact with the physical world. If used in combination with a smartphone or tablet camera, it raises some fundamental questions as to the conceptualization of learning place (the physical location of learning and instruction, including textbook use in and beyond the EFL classroom) as well as learning space (the cognitive, affective, and social-interactive dimension of learning, including computer-mediated communication and technology-enhanced learning inside and outside the classroom).

## 5.1 Conceptualizing learning place and space in the digital age

In order to gain a profound understanding of the challenges and opportunities of instruction and learning in the digital age, including the implementation of AR to enhance EFL textbook development and use, (at least) twelve dimensions of foreign or second language learning place and space need to be taken into consideration (see KURTZ 2015; for a brief summary of the ongoing international debate on the significance of learning in different physical places and virtual spaces see LEGUTKE 2017):

- The physical dimension (where does instruction/learning take place? (e.g. in the classroom, at the kitchen table, at the bus station, in a museum, etc. – as compared with learning in the cyberspace)
- The functionality-intentionality dimension (how is the place and space of language learning used in a purposeful way, for what particular purposes?)
- The relational-communicative dimension (how does the implementation of electronic technologies – such as AR – potentially change the way learners and teachers interact and communicate with each other in and beyond the classroom?)
- The familiarity-novelty dimension (how is the place and space of learning conceived of as a novelty space by teachers and learners in terms of learning language(s) and meeting culture(s)?)
- The interactional-discursive-intercultural dimension (who participates in the learning process, and how; e.g. in teacher-learner, learner-learner, face-to-face, computer-mediated interaction in and beyond the classroom?)
- The curricular-methodological dimension (how does the learning place or space contribute to accomplishing the goals and objectives as laid out in the school curricula and standards descriptions?)
- The symbolic-semiotic dimension (in what way does the integration of digital media change the way teachers and learners use language(s) to interact with each other in and beyond the classroom?)
- The affective dimension (what potential impact do conceptions of learning place and cyberspace have learner motivation, and, perhaps, anxiety?)
- The exemplariness dimension (what linguistic/intercultural content is suitable for developing intercultural communicative competence or sensitivity in and beyond the classroom in the 21st century?)
- The variability-elasticity dimension (how accessible and flexible is the learning place (location) or space (cyberspace) for learners and teachers?)
- The historical dimension (how significant is the learning place or space historically; how does it contribute to a better understanding of language and culture from a diachronical perspective?)
- The effectivity-effectiveness dimension (what is the surplus value of digitally supported language learning; how is it to be assessed?)

Each of these twelve dimensions refers to a research desideratum that needs to be addressed in the future, especially in view of the in-built potential of AR to bridge print-based and digital learning and teaching inside and outside the EFL classroom. It goes beyond the scope of this paper to discuss all implications of using AR for bringing

together print and digital resources and media for in-class and out-of-class instruction and learning. For the development of a coherent theory of AR-assisted textbook development and use, it will be crucial to look at these dimensions in much more detail and examine how they contribute to effective and efficient learning and student achievement. Current research on employing electronic media in foreign or second language education typically centers on the many ways learners and teachers can profit from well-designed software applications, rather than on the characteristics of the learning place (location) and space (cyberspace environments) in which these applications are intended to be used. However, since language learning in schools is typically textbook-driven and as such largely confined to the classroom, it is of great importance to investigate the affordances and constraints of AR-assisted learning in a combination of various learning environments (not just at school or at home), taking the most convincing and promising instructional approaches to foreign or second language education into consideration, including blended learning (see also SCHMIDT 2013; RÖSLER 2013, GRÜNEWALD 2017).

## **5.2 Implementing task-driven, AR assisted language learning and teaching**

According to Pegrum (2014: 25), “digital technologies open up space for introducing new pedagogies and reworking old ones, with educational approaches, methods, curricula, syllabi and lesson plans being reimaged in light of the affordances of new tools.” New generation (mobile) digital technologies and applications (including AR) “are especially suited to promoting approaches like constructivism and, explicitly or implicitly, social constructivism.” (ibid.).

Very broadly speaking, constructivist theories “are based on the idea that individual learners actively construct their understanding through their experiences and their existing knowledge base.” (ibid.). However, this necessitates “a subtle pedagogy that takes the focus off teachers and teaching – though it demands that educators adopt a complex structuring and guiding role – and places it on learners and learning.” (ibid.).

Task-driven language learning and teaching reflects the core tenets of constructivist approaches to education and learning (see ELLIS 2009). Starting from the assumption that learners learn languages best by using the target language to engage with and accomplish relevant, interesting, and meaningful communication tasks, language acquisition and learning is conceived of as here as a contextualized, active, collaborative, experiential, and, above all, student-centered, self-reflective process. The role of the teacher is to set the best conditions for learning, orchestrating and scaffolding the language learning process, rather than instructing learners in the traditional sense. As a large and growing body of research indicates, task-driven teaching and learning represents a powerful option for instruction and learning in EFL classrooms (for an overview, see, for instance, BYGATE 2015).

Many of today’s global and local EFL textbooks offer a variety of learning tasks, but tasks printed on a book page inherently lack the potential to “converge text, visuals, sound, motion media formats and various forms of interactivity” (CHURCHILL 2017, 227). This is, perhaps, too trivial to be of wider interest. At any rate, research on technology-

mediated task-based language teaching (TBLT) (see THOMAS/REINDERS 2010; GONZÁLEZ-LLORET/ORTEGA 2014) has preferred to examine the chances, challenges, and opportunities of incorporating a range of digital technologies (e.g. blogs, wikis, social networks, podcasts, VR platforms) into textbook-independent foreign language education up to now, largely ignoring the potential of AR for enhancing the textbook as the core medium of instruction in hybrid (print/digital), multimodal, interactive, and adaptive EFL learning environments. The trend 'to go radical' in terms of computer-assisted language learning (CALL) and computer-mediated communication (CMC) is unbroken; research interest in aligning traditional, printed textbooks and ancillary resources with 'print AR' to promote gradual, sustainable change in everyday EFL learning and teaching in and beyond the classroom is low.

This is unfortunate given the transformative power of AR. In conjunction with an EFL textbook, 'print AR' can serve a variety of purposes and functions. It can

- help learners to better handle and navigate the textbook by providing appropriate digital assistance composited with the printed page,
- enrich learners' experience of the English-speaking world by superimposing virtual imagery (photos, videos, photorealistic graphics, animations) on the printed textbook page (e.g. a picture of a famous building is turned into an authentic, 3D virtual multimedia tour through that building with communicative tasks of various kinds attached to each stop);
- assist learners in the discovery of structural and socio-functional aspects of the target language and its use in real world contexts by providing supplementary multimodal learning content and more intuitive, interactional guidance for learning (e.g. by presenting the target language in use in real world, digitally annotated contexts, etc.);
- help learners to notice key lexico-grammatical aspects of the target language by, for instance, offering virtual AR tutorial animations, interactive pop-ups with learning tips, or classroom blog communicative exchanges with peers or with the teacher;
- induce learners to explore language and culture from different perspectives, by opening virtual entrance doors to suitable web content, web quests, conferencing platforms, social networks, or to the blogosphere.

Looking at AR in language education in general, Hawkinson (2014: 155) points out: "These technologies can converge existing media like nothing before, bringing textbooks to life with video, individualizing online content into any situation, and enriching leaning experiences. But how teachers use these new tools will determine how meaningful they will be to language acquisition."

Therefore, it is crucial to look at the potential of 'print AR' from the language teaching perspective as well. As outlined in Kurtz (2014), 'print AR' can also serve to assist teachers in the process of planning and delivering instruction with the textbook (by offering digital overlays visible for the teacher only). Research on how and how often EFL practitioners actually use teaching manuals is scarce (or non-existent). Conceived

of as an assistive technology, 'print AR' could provide teachers with valuable support at all stages of textbook-driven teaching (pre-, while-, post).

### 5.3 Promoting AR-assisted differentiated instruction and individualized learning

Most EFL textbooks and bundled resources and materials used in German schools today are designed to facilitate and support differentiated instruction (internal differentiation) (see, for instance, HAAß 2017). However, internal differentiation in textbooks is typically reduced to distinguishing a) between a *fundamentum* (the core curriculum) and an *additum* (extension activities), and b) between different levels of exercise or task difficulty. Characteristically, and contrary to current theorizing and research (see TRAUTMANN 2010), the overarching focus is on textbook-driven, top-down internal differentiation rather than on learner-centered, self-regulated, bottom-up differentiation. One major exception to this is portfolio-based self-assessment, which has become standard in today's bundled EFL textbook packages.

At any rate, in view of current research on differentiated instruction and learning in EFL classrooms (see, for instance, STROHN 2015), it appears to be more appropriate and potentially effective to conceive of internal differentiation in a broader sense that includes a wider spectrum of top-down and bottom-up strategies and techniques, placing more emphasis on individualized, learner-requested feedback and support. Due to space restrictions in print, this will be difficult (if not impossible) to realize. Here as well, 'print AR' can play a pivotal, innovative role. In conjunction with the textbook, it can

- create a print-based, but virtually diversified, hybrid (print, digital) learning sphere which is conducive to individuals with different language learning biographies, preferences, proficiencies and needs;
- capture individual learners' interests and keep them absorbed in their learning activities by providing a flexible, multimodal user interface which is capable of presenting language and culture in many different ways (visual, auditory, kinesthetic, etc.);
- give learners more freedom to choose (in terms of self-regulated differentiation; providing a range of choices, which differ from other-regulated, textbook-based differentiation);
- offer supplementary tasks and activities which are better matched to individual learners' needs and provide a suitable level of challenge (e.g. text comprehension questions in the book are augmented by highlighted digital text passages, or by digital bookmarking and note-taking options; closed questions are augmented by more open questions and various kinds of tasks; tasks-in-progress are expanded by audio or video augmented chatting);
- enable learners to take greater control of the speed and direction of their learning by offering various assistive tools, aids, and types of feedback, including, for instance, auditory and audio-visual vocabulary annotations to instantly check unknown words and phrases;
- encourage individual learners to consolidate and expand on what they have learned (in and beyond the classroom) by offering additional, increasingly real-world communicative tasks;

- provide additional, more individually tailored opportunities for target language practice in all major areas of competency and skill (see also HERRINGTON KIDD/CROMPTON 2016).

It is beyond the scope of this paper to discuss the potential of integrating ‘print AR’ in task-driven, differentiated instruction in the textbook-based EFL classroom in more detail. Undoubtedly, the ideas listed above represent just a fraction of what is technologically feasible and pedagogically desirable.

## 6 Putting AR in practice: the ‘Zoom app’

The ‘Zoom-App’ (see <http://www.zoom-app.de>) is a pioneering ‘print AR’-application for use in conjunction with bundled EFL textbook packages such as *Camden Town*, *Camden Market*, or *Notting Hill Gate*, all produced and distributed by *Bildungshaus Schulbuchverlage*, a large provider of educational media in Germany (for further information, see <https://verlage.westermanngruppe.de/landing/zoom-app/download>). The app is available for Android (Google) and iOS (Apple) and needs a smartphone or tablet camera to scan and augment the printed textbook page:



Picture 1: The ‘Zoom-app’ in action

Based on the printed textbook page, the app is capable to generate supplementary digital content in real time. As such, it provides EFL learners with assistive audio and audio-visual material, which brings the pages to life, making the learning content (language, culture) more attractive, meaningful and easily accessible, but it also offers learners additional strategic support in central areas of competency and skill (grammar, vocabulary, pronunciation, etc.). For instance, a vocabulary trainer offers learners the opportunity to acquire and practice the core vocabulary of the corresponding textbook unit at their own pace, anywhere and anytime – and a digital grammar tutor provides them with additional, easily accessible guidance and support (for an overview, see GOLLA/KURTZ 2016).

The potential of the ‘Zoom-app’ is huge, but at present, the app is limited to a few basic features or functions (adding, supplementing, and merging). Other features or functions might also be beneficial for enhancing the EFL textbook (removing, hiding, and filtering). Apart from these technological considerations, it is important to note that the

app does not incorporate any gameplay component yet, which might increase learners' interest in using it in out-of-class environments. The app also lacks in-built support for recording, revising, exchanging, or submitting all kinds of oral homework. An integrated web portal could provide guided access to further internet resources and materials. If the app were extended to provide teachers with pre-, while- and post-instructional assistance, it could ultimately grow into a complex assistive system that goes far beyond the printed textbook manual (for further details, see KURTZ 2014).

## Summary and Outlook

'Print AR' complements the EFL textbook, rather than replacing it. Since it is not bound by the physical limitations of the printed page, 'print AR' can enrich and enhance learning in EFL classrooms in fascinating, more meaningful, and perhaps, more effective ways. The major advantage of 'print AR' is its capacity to promote gradual, continuous change in the classroom by merging textbook-driven, 'pen and paper' learning with digital learning in all its various forms. However, it is of great importance to realize that the hybrid, multimodal, interactive, and adaptive character of 'print AR' (together with its update capability and portability) necessitates further theoretical and empirical research in all of the twelve dimension of learning place and learning space outlined in this paper. As MOMINÓ (2015: 5) points out, "[t]echnical resources are rarely the main hindrance in [...] effectively embracing ICTs in all its spheres of activity. [...] The effectiveness of technology is always dependent on the nature of its organizational, social and cultural framework."

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