Vera M. Savić
University of Kragujevac
Faculty of Education in Jagodina
Department of Philology

DOI: 10.46793/MANM4.191S
УДК: 37.091.3::51-028.31(811.111)

INTEGRATING MATHEMATICS CONTENT INTO PRIMARY ENGLISH CURRICULUM THROUGH CONTENT-BASED INSTRUCTION

Abstract: Success in learning a foreign language is seen as the ability to use a foreign language in a variety of life contexts. Integration of mathematics content into a grade-appropriate English curriculum has the potential to enlarge the possibilities for young learners to experience more authentic and meaningful communication and more varied life-like interaction in a number of content-based activities. The aim of the paper was to study mathematics content in international coursebooks used for teaching English as a foreign language (EFL) in grades 1–4 in Serbian primary schools and to explore the means for integrating mathematics content into English classes. The study was based on a content analysis of seven EFL coursebook sets and focused on mathematics content analysis in relation to six study questions. The results revealed four distinct key content integration categories and showed that some of the coursebooks surveyed in the study contain mathematics content that is well integrated into language curriculum and supports deeper learning of both mathematics and language through cross-curricular links. However, the results also indicated that mathematics content in the coursebooks surveyed is mainly not grade appropriate or cognitively challenging enough, which requires EFL teachers to provide more materials for expanding the cross-curricular links. Pedagogical implications of the study refer to EFL teachers' professional development needs for enhancing their own skills to implement content-based instruction by introducing creative and motivating content-based and grade appropriate materials and tasks into their classrooms and thus engage the flexible minds of young learners in a holistic learning experience.

Keywords: young learners, content-based instruction, mathematics content, primary English curriculum, EFL coursebooks.

verasavic035@gmail.com

Introduction

The status of English as an international language is being strengthened throughout the globe, affecting the role English as a foreign or second language (EFL/ESL) plays in education systems worldwide (McKay, 2018). Firstly, governments are introducing EFL/ESL programmes earlier than they did several decades ago, mostly at primary school or even preschool levels, and secondly, the choice of English as a foreign language prevails over other languages offered in schools (Enever & Moon, 2009; Pinter, 2011). In some contexts, like in Serbia, English has gained the status of a compulsory school subject from grade one (Official Gazette 10, 2017; Savić & Shin, 2013), while a second foreign language is introduced later, mainly in primary grade five, meaning that all young learners (children aged 7–11) in Serbian state schools attend English classes from the very beginning of their primary education.

To be effective and sustainable, these early foreign language learning programmes need to meet a number of requirements and challenges, most of which relate to learners themselves and to their learning environment. Current EFL/ESL pedagogy proposes creating a context for communicative language use similar to native language learning. This can be done by designing classroom activities and tasks that are full of practice, offer a plenty of repetition and recycling of the new language, are supported with visual materials, realia, gestures and a lot of praise, and provide opportunities for meaningful and purposeful use of the language in situations that are connected to learners' interests and lives, and are also social and enjoyable (Read, 2003; Shin & Crandall, 2014). Content-based approaches, like Content-Based Instruction (CBI) or Content and Language Integrated Learning (CLIL), can contribute to creating such conditions because they connect language teaching and subject content teaching, like mathematics, geography, history, social studies, art or physical education, and thus respond to learners' interests, bring the world into the classroom and create conditions for meaningful and purposeful communication (Bentley, 2010; Coyle, Hood, & Marsh, 2010; Curtain & Dahlberg, 2010; Enever & Moon, 2009; Shin, 2007; Shin & Crandall, 2014).

An important prerequisite for making early language learning programmes successful and sustainable is policy support in terms of specifically trained teachers of young learners, child-friendly curricula and materials, and teaching approaches adopted. The following section describes the primary language learning context in Serbia and the policy that supports the introduction of innovative approaches for achieving the effectiveness of primary language learning programmes.

Background to the Study

Striving to increase the quality of the process of education and of its outcomes, in 2012 the Serbian Ministry of Education, Science and Technological Development (MoESTD) adopted the Strategy for Education Development in Serbia by 2020 (MoESTD, 2018). The Strategy and the corresponding Action Plan resulted in an extensive reform of primary education in Serbia: first, in 2017 the new Rulebook on the Teaching and Learning Plan for the First Cycle of Primary Education (Rulebook), and the teaching and learning curriculum for the first grade of primary education were introduced (Grade One Curriculum) (MoESTD, 2018; Official Gazette 10, 2017); then, in the period 2018–2019 the teaching and learning curricula for the second, third and the fourth grades of primary education were also introduced (Grade Two/Three/Four Curriculum) (Official Gazette 16, 2018; Official Gazette 5, 2019; Official Gazette 11, 2019). The Rulebook (MoESTD, 2018) and Grade One Curriculum have been implemented since September 2018, while Grade Two/Three/Four Curricula have been implemented since September 2019.

Both the Rulebook (MoESTD, 2018) and grades 1–4 curricula comprise new general competence-based requirements for primary education, focusing on attainment targets (functional knowledge and skills) and including interdisciplinary themes into the core subjects. One of the most significant changes introduced by the new curricula is that "instead of obligatory and recommended contents currently in place, the new programs should include key concepts of curricular content" (MoESTD, 2018: 23). The curricula are oriented towards achieving outcomes, rather than on teaching the subject content, and the teachers are instructed to apply active teaching methods, draw on cross-curricular connections by implementing thematic teaching, and apply project-based teaching at all levels of education. Apart from strengthening learners' key competences, teachers are required to focus on inter-curricular competences by promoting information technologies and skills needed for lifelong learning (MoESTD, 2018). These modifications have created a framework for teaching in a more comprehensive way by applying the methods and subject pedagogies oriented towards outcomes and learners' competences. The Rulebook gives a common framework for teaching all curricular subjects, while grade curricula determine more specifically the teaching content and approaches.

English possesses a status of a compulsory subject in the first cycle of primary education (grades 1–4) and is taught from primary grade one. The changes introduced by the reformed primary grades 1–4 curricula give teachers a lot of freedom in lesson planning, from selecting the content, to deciding on methods, materials and activities appropriate to their teaching contexts, i.e. responding to the needs, interests and background knowledge of their

learners. Teachers are further directed towards contextualising the curriculum by selecting the materials from various resources, designing life-like interactive activities, and explicitly teaching the cultural content for developing learners' intercultural awareness. What is more, English language teachers are instructed to integrate cross-curricular themes and non-linguistic subject content into the language classroom. Thematic language teaching through non-linguistic subject content is an approach to foreign language teaching known as Theme-Based Instruction (TBI), a language focused variety of CBI/CLIL, which will be explained in the following section.

Content-Based Instruction in Teaching English to Young Learners

Language approaches, like TBI, that use content from non-linguistic subjects to contextualise foreign language teaching and learning and to enhance language proficiency, are regarded language-driven CBI because the teaching focuses mainly on linguistic development, while content learning is mainly incidental (Curtain & Dahlberg, 2010; Shin, 2007; Shin & Crandall, 2014). On the other hand, CLIL is more content-driven and focuses on simultaneous learning of subject content and a foreign language (Bentley, 2010; Coyle, Hood, & Marsh, 2010). Two basic varieties are distinguished among numerous models on the soft CLIL – hard CLIL continuum applied in education systems worldwide: soft CLIL is applied in programmes that "teach topics from the curriculum as part of a language course" (Bentley, 2010: 6); but if a half of the curriculum is taught in a foreign language, the approach can be referred to as hard CLIL (Bentley, 2010). This means that content-based programmes range from subject-led, like total immersion, bilingual education, or partial immersion, to language-led, like different models of thematically based language teaching, from teaching some curricular topics in language lessons once a week or once a month, to planning and teaching a thematic unit (TU), i.e. series of four to five language lessons connected by a common theme and incorporating content from other subjects in a grade curriculum (Cenoz, 2015; Shin, 2007; Shin & Crandall, 2014). In language-driven CBI, lessons are taught by an EFL teacher, who uses the content from the regular L1 subject curriculum to enhance learners' language development (Coyle, Hood, & Marsh, 2010; Banegas, 2013).

The principal rationale behind CBI/CLIL programmes lies in their ability to enhance educational outcomes. Research in the area of CBI points to a number of benefits of applying content-based approaches, seen mainly in learners' cognitive and linguistic development, like problem solving skills, higher order thinking, listening and reading skills, increased motivation and

more active engagement in classroom activities (Coyle, Hood, & Marsh, 2010; Ioannou-Georgiou, 2012). Furthermore, task-based and/or project-based learning, which is often part of a CBI/CLIL/TBI approach, provides an authentic context for meaningful communication, increases exposure to a foreign language, develops learners' social skills, their creative and critical thinking, and a number of learning skills and strategies that can be applied across the curriculum (Ioannou-Georgiou, 2012).

Integrating Mathematics Content into Primary English Curriculum

Content-based language teaching mainly draws upon learners' everyday experience and general knowledge and is thus able to connect school and home through themes and topics, which makes languge lessons interesting, engaging and motivating (Brewster, Ellis & Girard, 2004). Mathematics topics and issues for young learners include numbers, counting, measuring, shapes, telling the time, and money, and are often introduced through rhymes, chants, songs and games, integrating all four language skills in the process.

One of the factors that plays a crucial role in CBI/CLIL is the availability of teaching materials in a foreign language. Studies related to coursebook evaluation, both general language coursebooks and CLIL ones, show varied results. A study of CLIL content in international EFL coursebooks for teenagers in Argentina (Banegas, 2013) showed that there was little correlation of the subject-specific content in English and the corresponding content in the native language (L1), and that the subject content in EFL coursebooks was oversimplified and focused on lower-order thinking tasks. Studies conducted in the Check Republic considered authentic mathematics textbooks in English used in CLIL classrooms, and found linguistic and cultural obstacles related to mathematical terminology, grammar and general vocabulary (Novotná & Moraová, 2005; Novotná, Moraová, & Hofmannová, 2009). The authors suggested that teachers should help students develop vocabulary through using games, crosswords, and illustrations, by frequent repetition and by keeping a balance between language and mathematics learning (Novotná & Moraová, 2005; Novotná, Moraová, & Hofmannová, 2009).

Mathematics Content in International Primary EFL Coursebooks

Bearing in mind the new curricula prescriptions, the benefits of CBI/CLIL highlighted by a number of studies, as well as the varied results of the studies of mathematics content in EFL coursebooks, we aimed to explore the ways international primary EFL coursebooks integrate mathematics content

into Serbian EFL classrooms. We were mainly interested to evaluate the mathematics content provided in the coursebooks selected by primary English teachers in Serbia for their regular practice.

It is significant to point out that EFL teachers in Serbia are allowed to choose a grade coursebook that can best meet the needs of their respective learners and teaching contexts, but the choices are limited by a severe accreditation process all coursebooks on the market must undergo before being added to the list of the coursebooks accredited for regular use. This process is the responsibility of the Institute for the Improvement of Education in Serbia, an agency trusted by the MoESTD with training coursebook evaluators, collecting three independent evaluations for each coursebook set (usually involving a pupil's book, an activity book, a teacher's book, audio CD and DVD, iTools, flashcards, story cards, and/or posters), and submitting to the Minister a list of books suggested for accreditation for an unlimited period of time (see http://www.mpn.gov.rs/udzbenici/). Book accreditation is necessary before adding a new title to the list and is usually done upon introduction of reformed curricula to make sure that a coursebook complies with the grade curricula requirements. Consequently, the EFL coursebooks accredited by the Minister and selected for use in grades 1–4 in Serbia, should comply with current grade 1–4 curricula referred to in the above sections.

Another important fact related to EFL coursebooks selected by EFL teachers of young learners in Serbia is a long tradition of using international coursebooks, mostly published in Great Britain by well-known publishers. During the last educational reform some adaptations of the coursebook content have been made to respond to the accreditation and curricular requirements: introduction of cross-curricular content, cultural references and aspects of intercultural communication. Our specific interest in the study presented in this paper was mathematics content as a form of cross-curricular content required by the reformed primary curriculum.

Aims of the study

In the light of the above discussion, the study aimed to examine mathematics content provided in general EFL coursebooks used by teachers and learners in grades 1–4 in Serbia. Mathematics content in the EFL coursebooks was analysed and evaluated in relation to the following study questions (based on Banegas, 2018: 26–27):

1. whether mathematics content is a regular or add-on component;
2. whether mathematics content is the core of a unit or only appears as illustrative or disjointed from the rest of the unit;
3. whether the mathematics content is relevant and cognitively challenging;

4. whether mathematics content is related to the grade curriculum or it is completely unrelated;
5. whether mathematics content is presented through different formats and modalities (oral, audio, visual and written);
6. whether there are activities which integrate the mathematics content and language.

These six study questions allowed a comprehensive analysis of the relationship between mathematics content and language in the selected coursebooks.

Methodology

The study was based on a content analysis of seven international general EFL coursebook sets available for teaching English to learners aged 7–11. The titles were selected from the list of accredited coursebooks, and their frequency of use in local state primary schools was a significant criterion. Two titles were selected for grades 1, 2 and 3, respectively, and one title for grade 4 (see Table 1). Each book was part of a series, and six of them were published by Pearson Akronolo (Great Britain, Serbia), and one by Oxford University Press (Great Britain). Being widely adopted, these coursebooks were considered by the author of this paper to have been evaluated as quality materials by local EFL teachers.

Table 1: The list of coursebooks surveyed in the study.

Grade	**Title**	**Author(s)**	**Publisher(s)**
One	*Our Discovery Island Starter*	Tessa Lochowski	Pearson Akronolo, UK, Serbia
One	*New English Adventure Starter A*	Regina Raczynska, Cristiana Bruni	Pearson Akronolo, UK, Serbia
Two	*Our Discovery Island 1*	Linnette Ansel Erocak, Jeanne Perrett	Pearson Akronolo
Two	*New English Adventure Starter B*	Tessa Lochowski, Cristiana Bruni	Pearson Akronolo
Three	*Discover English Starter*	Judy Boyle	Pearson Akronolo
Three	*Family and Friends 1, second edition*	Naomi Simmons	Oxford University Press, UK
Four	*Discover English Level 1*	Kate Wakeman	Pearson Akronolo, UK, Serbia

Our study focused on the content analysis of mathematics content in the above coursebooks, its comparison with the mathematics content in the grade curriculum, and its integration into the linguistic content.

Results and discussion

Content analysis of the mathematics content in the surveyed EFL coursebooks revealed four distinct key categories: 1. Mathematics content; 2. Language content into which mathematics content is integrated; 3. Modality of presentation of the mathematics content (oral, audio, visual and written); and 4. Skill(s) practised through the mathematics content (listening, speaking, reading, and writing). The identified content categories were further analysed and evaluated with reference to the six study questions (see *Aims of the study*). The key categories of content analysis will be presented and discussed per individual grade coursebooks and in relation to the study questions.

Results and discussion of grade one EFL coursebook mathematics content

The results (see Table 2) showed that both grade one coursebooks surveyed in the study, i.e. *Our Discovery Island Starter*, by Tessa Lochowski, published by Pearson Akronolo, and *New English Adventure Starter A*, by Regina Raczynska and Cristiana Bruni, published by Pearson Akronolo, have a similar treatment of the mathematics content by considering numbers 1–10 as a lexical set and a linguistic content, rather than as a cross-curricular content. Besides numbers, in the coursebooks there is also reference to orientation in space and to sizes. All number concepts are introduced and practised in different contexts created in units with varied thematic foci, lexis and structures. These include language content related to asking and answering questions about the number of objects and people, about somebody's age, and also saying how old someone is, what someone has got, describing a picture or the size of animals, and naming left and right hand.

Table 2: Analysis of grade one EFL coursebook mathematics content.

Grade One				
Coursebook title, author(s) and publisher	**Mathematics Content**	**Language Content (examples)**	**Modality of Presentation (oral, audio, visual and written)**	**Skill(s) Practised**
Our Discovery Island Starter, by Tessa Lochowski (Pearson Akronolo)	Numbers 1–10 (introduced in sets 1–5, 6–10); Number concepts; Counting 1–10 (forwards and backwards), guessing the numbers (in L1); Size (big, small) Orientation in space (left, right).	*How many (balloons)? How many (books) can you see? How old are you? I'm seven. How old is he?He's ten. Three purple cakes. I've got two arms. It's a small rabbit. Left. Right.*	Written (digits), visual (pictures, flashcards, objects, mime, colouring, TPR – clapping, stamping, jumping, games, drawing, matching), audio & oral (chants, songs, repetition, games, drawing, pointing, answering a question, describing)	Listening, speaking. (listen and chant; listen and circle; listen and number; match and count, then say)
New English Adventure Starter A, Regina Raczynska, Cristiana Bruni (Pearson Akronolo)	Numbers 1–10 (introduced in sets 1–5, 6–10); Counting 1–10 Counting (forwards and backwards) Size (big, small) Orientation in space (left, right).	*How many (fish/dolls/ shells)? What is number (one)? What animals are big? They're big sisters. I've got a big book. I've got two books.*	Written (digits), visual (pictures, flashcards, objects, mime, colouring, TPR – clapping, stamping, jumping, games, drawing, matching), audio & oral (audio CD, chants, songs, repetition, games, drawing, pointing, answering a question, describing).	Listening, speaking. (listen and tick, listen and match, listen and colour, listen and circle, listen and point, count and tick or cross, count and draw).

Although numbers 1–10 and counting are a regular component of almost all the units in the coursebooks, mathematics content cannot be regarded as a regular component or core of the units for several reasons. First, mathematics content in grade one curriculum is much wider and involves numbers 1–100. Second, mathematics content in grade one curriculum is more complex and includes counting, adding, subtracting, and geometry. Third, grade one mathematics curriculum also includes measurement and orientation in space. Consequently, mathematics content in these two EFL coursebooks is related to the grade curriculum to a very limited level.

Considering the formats and modalities for introducing numbers and counting, all channels that support learning and comprehension are used: oral, audio, visual and written. What is more, these formats are rather varied and involve modalities like pictures, flashcards, objects, mime, colouring, total physical response (TPR) activities like clapping, stamping, jumping, and then games, drawing, matching, chants, songs, repetition, games, drawing, pointing, answering a question, and describing. These activities integrate mathematics content with language in an appropriate way, making mathematics content the core of the language activities. As for the language skills, since only listening and speaking are developed in foreign language classrooms in grade one, these skills are dominant in the activities surveyed. Importantly, a great variety of well-sequenced activities is included in both coursebooks.

On the one hand, the mathematics content in grade one coursebooks surveyed is appropriate considering the fact that children are beginners in foreign language learning and do not possess enough language to comprehend other mathematics components (like mathematical operations) except numbers. On the other hand, it is strange that the numbers are not extended to at least 20, or that simple addition or subtraction problems are not introduced. Children are cognitively ready to do for simple addition and subtraction problems, while linguistically it does not require more than introducing a few new phrases.

Results and discussion of grade two EFL coursebook mathematics content

The results (see Table 3) showed that two grade two coursebooks surveyed in the study, i.e. *Our Discovery Island 1*, by Linnette Ansel Erocak and Jeanne Perrett, published by Pearson Akronolo, and *New English Adventure Starter B*, by Tessa Lochowski and Cristiana Bruni, published by Pearson Akronolo, have a totally different treatment of the mathematics content: the former involves four lessons with key focus on numbers 1–20, addition and subtraction problems, and different geometrical shapes, while the latter has no real focus on mathematical content, but uses numbers 1–10 and geometrical

shapes as add-ons only, mainly for counting and naming activities. What is more, the former coursebook introduces signs for doing addition and subtraction, and provides a number of cognitively challenging mathematics problems, as well as highly creative tasks based on geometrical shapes and sizes, with a true cross-curricular focus, accompanied with a number of lexical phrases for expressing sums, describing the arrangement of geometrical shapes and sizes, and for developing spacial sense. On the contrary, the latter coursebook has scarce and a disjointed use of numbers in oversimplified contexts.

Table 3: Analysis of grade two EFL coursebook mathematics content

Grade Two				
Coursebook title, author(s) and publisher	**Mathematics Content**	**Language Content (examples)**	**Modality of Presentation (oral, audio, visual and written)**	**Skill(s) Practised**
Our Discovery Island 1, by Linnette Ansel Erocak, Jeanne Perrett (Pearson Akronolo)	Numbers 1–20 Counting 1–20 Sums (cross curricular focus): addition problems, subtraction problems; plus sign, minus sign, equals sign; doing sums on the board; Size (big, small, long, short) Shapes (circle, triangle, square, rectangle; cross curricular focus – the whole lesson).	*How many (cars)?* *Fifteen (cars).* *How many (trains) can you see?* *I can see (seven trains).* *Plus, minus, equals* *Four bikes minus three bikes equals one bike.* *I've got two feet/arms* *I've got ten toes* *I've got big eyes/ small ears.* *He's got long/short hair.* *She's got ten triangles.* *It's got six circles.*	Written (digits), visual (pictures, flashcards, objects, mime, colouring, TPR – clapping, stamping, jumping, games, drawing, matching), audio & oral (audio CD, chants, songs, repetition, games, drawing, pointing, answering a question, describing).	Listening, speaking, reading, writing. (listen and say; find and count; find and count, then write; match the number and say; ask and answer; listen and number; look and write; listen and point; draw sums; write the missing signs and say the sums; draw, then write and say; find shapes; listen, then look and circle; point to a triangle).
New English Adventure Starter B, by Tessa Lochowski, Cristiana Bruni (Pearson Akronolo)	Numbers 1–10 (introduced in sets 1–5, 6–10); Counting 1-10 Shapes: circle, square, triangle, rectangle; Size (big, small).	*How many doors/windows?* *How many fingers?* *How many cows (can you see)?* *Is it big or small?*	Written (digits), visual (pictures, flashcards, objects, mime, colouring, TPR – clapping, games, drawing, matching), audio & oral (audio CD, chants, songs, repetition, games, drawing, pointing, answering a question, describing).	Listening, speaking, reading, writing. (count and write; read and draw; listen and say, then listen and colour the shapes; make a shape picture; count and match).

Table 3 also shows that all four modalities of presentation (written, visual, audio and oral) are applied by both coursebooks, but that *Our Discovery Island 1* provides a much bigger number of different activities for practising all four language skills. Moreover, in case of *Our Discovery Island 1* the activities are much more varied and involve not only modalities like pictures, flashcards, objects, mime, colouring, total physical response (TPR) activities like clapping, stamping, jumping, then games, drawing, matching, chants, songs, repetition, drawing, pointing, answering a question and describing, but also gap-filling, solving puzzles and designing. These activities integrate the mathematics content with language in an appropriate way, making mathematics content the core of the language activities.

However, it must be stressed that although mathematics content in *Our Discovery Island 1* is comprehensive and complex, it does not reflect the scope of mathematics content in grade curriculum which includes addition and subtraction operations with numbers to 100, multiplication of single digit numbers, measurement and units for measuring length. Children's cognitive readiness allows introduction of numbers to 100, addition and subtraction problems to 100, and various examples of measurement in a foreign language as well. Importantly, measurement tasks or puzzles related to real life examples of geometrical shapes can bring the real world into the classroom and make language use more interesting, meaningful and purposeful.

Results and discussion of grade three EFL coursebook mathematics content

The results (see Table 4) showed that two grade three coursebooks surveyed in the study, i.e. *Discover English Starter*, by Judy Boyle, published by Pearson Akronolo, and *Family and Friends 1*, by Naomi Simmons, published by Oxford University Press, differ substantially in the scope and treatment of the mathematics content: while the former contains several lessons with clear focus on numbers 0–100 (presented in two sets, as 0–20 and 21–100), counting and number sequence practices, and also includes the topics of money and time, the latter deals only with numbers 1–20 (introduced as sets 1–10 and 11–20), counting and geometric shapes.

Table 4: Analysis of grade three EFL coursebook mathematics content.

Grade Three				
Coursebook title, author(s) and publisher	**Mathematics Content**	**Language Content (examples)**	**Modality of Presentation (oral, audio, visual and written)**	**Skill(s) Practised**
Discover English Starter, by Judy Boyle (Pearson Akronolo)	Numbers 0–100 (introduced in sets 0–20, 21–100); Counting 1–100 Number sequences Money (pounds, pence) Telling the time.	*What's your phone number? It's ...* *Written number words: eleven, twelve, thirteen, ..., twenty* *How old are you?* *I'm eleven.* *Are you eleven?* *How much is the robot?* *It's twenty-two pounds fifty.* *There is a CD player on the desk. There are three photos on the desk.* *What time is it? It's two o'clock. It's half past three.*	Written (digits and words), visual (pictures, flashcards, objects, mime, games, drawing, matching), audio & oral (audio CD, chants, songs, repetition, games, drawing, pointing, answering a question, role play).	Listening, speaking, reading, writing. (listen and circle the numbers; write the next number; listen and complete the phone numbers; match the words with numbers; read and match; complete the numbers; listen and repeat; write a party invitation; draw times on the clocks).
Family and Friends 1, second edition, by Naomi Simmons (Oxford University Press)	Numbers 1–20 (introduced in sets 1–10 and 11–20); Counting 1–20 Shapes: circle, square, triangle, rectangle.	*How old are you? I'm seven.* *Ten fingers.* *I've got two sandwiches.* *It's got three sides. It's a triangle.* *There are two beds.* *There are ten in the bed.*	Written (digits and words), visual (pictures, flashcards, objects, mime, games, drawing, matching), audio & oral (audio CD, chants, songs, repetition, games, drawing, pointing, answering a question).	Listening, speaking, reading, writing. (listen and tick; sing and do; read the chant; listen and sing).

In both coursebooks numbers are integrated into language content related to practising plural of the nouns, mainly in questions and answers about the number of objects or persons and about somebody's age. However, only in *Discover English Starter* are learners encouraged to use numbers bigger than 20 to talk about the age of family members, to express money values, or to tell the time. What is more, the same coursebook contains the functional language for asking about someone's telephone number, as well as for asking about the time and for telling the time by expressing it in hours and minutes.

Both coursebooks contain the language for integrating mathematics content that applies all four modalities of presentation (written, visual, audio and oral) and integrates all four language skills (listening, speaking, reading and writing). However, *Discover English Starter* uses mathematics content accompanied with a lot of visuals, in a variety of activities that support understanding, and allows learners to personalise the language and mathematics content through activities like writing their own phone numbers, asking about somebody's phone number, and writing an invitation to a party that includes information about the scheduled time.

The analysis of mathematics content in grade three coursebooks shows that in *Discover English Starter* mathematics content is integrated into language as core content of several lessons, appears as a regular component of the lessons presented through different formats and modalities in activities which integrate the mathematics content and language in a successful way. On the other hand, mathematics content in *Family and Friends 1* is just an add-on component, mainly illustrative, applied in a rather limited number of activities. What is missing in both coursebooks is a cognitive challenge and greater relevance of mathematics content to the grade curriculum which involves numbers to 1000, mathematical operations with three-digit numbers, measurement of length, mass, volume and time. Some of the mathematics content that is relevant to grade-three learners life experience, like measurements, should be integrated into the language content as well.

Results and discussion of grade four EFL coursebook mathematics content

The results of grade four courebook (see Table 5) *Discover English Level 1*, by Kate Wakeman, published by Pearson Akronolo, show that the mathematics content is rather varied and very well integrated into language content. Numbers 0–100 are practised for asking and answering about the number of things and people, for expressing somebody's age, and for telling the time. Ordinal numbers are introduced and practised in telling the date, giving information about the date of birth and birthday.

Table 5: Analysis of grade four EFL coursebook mathematics content.

Grade Four				
Coursebook title, author(s) and publisher	**Mathematics Content**	**Language Content (examples)**	**Modality of Presentation (oral, audio, visual and written)**	**Skill(s) Practised**
Discover English Level 1, by Kate Wakeman (Pearson Akronolo)	Numbers 0–100 Telling the time. Orientation in space (left, right) Size (short, long) Calendar and ordinal numbers.	*We finish school at three o'clock.* *It's a quarter past three.* *It's ten to nine.* *Turn right.* *He's fourteen years old.* *There are sixty stories.* *Is he in twenty-one films?* *You can read them in sixty-three languages.* *It's a short month.* *Mum's birthday is on Mach 1st.* *It's the twentieth.* *On September 26th.*	Written (digits and words), visual (pictures, flashcards, objects, mime, games, drawing, matching), audio & oral (audio CD, chants, songs, repetition, games, drawing, pointing, answering a question; dialogues).	Listening, speaking, reading, writing. (read and listen; listen and number the actions; write the times; listen and complete the rap; match the directions to the pictures; listen, chant and match; play word tennis; read and complete, use these numbers).

The analysis of shows a comprehensive integration of mathematics content into language as core content of several lessons that appears as a regular component of the lessons that focus on giving information about habitual activities and their time schedule, talking about the calendar and dates, describing size of things, and orienting in space. These functions are a regular component of the lessons, and are presented through different formats and modalities in activities which integrate all language skills. The activities are very well sequenced and innovative in terms of introducing rap songs, o playing games, like word tennis. Although they may seem not cognitively challenging enough, they represent an appropriate challenge in terms of recycling the language for telling the time and dates, which is rather difficult to master in English.

Still, mathematics content in this particular coursebook can be extended to include tasks for guessing number sequences, written textual problems with relevance to real life contexts which require adding, subtracting, multiplying or dividing numbers to 1000, simple fractions, and even posing problems and formulating questions from everyday life. These extensions will allow greater relevance of *Discover English Level 1* mathematics content to grade curriculum, and also give opportunities to learners to develop their mathematical skills and language skills simultaneously.

Conclusion

The aim of the study was to investigate mathematics content in general international EFL coursebooks used for teaching English in grades 1–4 in Serbian primary schools. The focus was on evaluating mathematics content in each coursebook in terms of its scope, relevance to grade curriculum, cognitive challenge, and its integration into language in terms of formats and modalitis of presentation, language skills and type and number of activities. The results indicate that most of the coursebooks surveyed in the study contain mathematics content that is very well integrated into language content and supports language learning by creating opportunities for more authentic and meaningful communication (topics of age, time, date, size, measure, price, space orientation), more varied interaction in a number of activities, and deeper learning of both mathematics and language through cross-curricular links.

However, there is the need to extend mathematics content in EFL coursebooks for all young learner grades to include more mathematics grade content and raise the cognitive challenge with real life problems related to basic mathematical operations, measurement of length, size, space, mass and volume. As a consequence, pedagogical implications of our study should involve the need

for encouraging EFL teachers to select and/or create materials and activities that should make up for the mathematics content missing in the coursebooks surveyed in the study. Such materials and activities should contribute to joint solving of mathematical problems, promote critical and creative thinking and interaction (Mehisto, 2012), and should also provide the necessary meaningful and purposeful context for genuine communication, help children to gain confidence in using English, enhance their understanding of mathematics concepts, and contribute to their overall academic development. Some highly useful materials are freely availabile on the internet, like international TIMMS tests in the English language, which contain mathematics problems at three levels of difficulty for grade four learners, appropriate to be used with learners in Serbia (Kadijevich, 2019). Teacher provided materials should involve charts, maps, short videos or animations, and should prepare learners for hands-on activities like cooking food (real and imaginary) and writing recipes, planning imaginary journeys and holidays, and designing an imaginary world. Furthermore, learners should be taught how to express results of their classroom surveys both in numbers and in the form of bar charts, and thus get a general understanding of how information may be presented through graphic organisers.

Providing content-based materials may be a challenge for EFL teachers and may require focused professional development in this area (Savić & Shin, 2016), both for enhancing their awareness of the benefits of integrating mathematics content into language teaching for developing learners' communication skills, cultural awareness, and group-work collaboration skills, and for improving learners' reasoning skills, precision and accuracy of expression, which can also have positive effects on language learning. Further studies are needed to identify factors of cross-curricular links between mathematics content and language, on the one hand, and learners' competence development, on the other hand. Still, educators should be encouraged to apply a content-based approach as the one that has been shown to effectively promote a holistic approach to teaching and learning, and to greatly contribute to developing core skills and a range of learners' competences prescribed by the new Serbian Rulebook (MoESTD, 2018).

References

Banegas (2013): Darío Luis Banegas, An investigation into CLIL-related sections of EFL coursebooks: issues of CLIL inclusion in the publishing market, *International Journal of Bilingual Education and Bilingualism*, Vol. 17, No. 3, 345–359.

Banegas (2018): Darío Luis Banegas, Evaluating language and content in coursebooks. In M. Azarnoosh, M. Zeraatpishe, A. Faravani, H. R. Kargozari (Eds.), *Issues in Coursebook Evaluation* (pp. 21–29). Leiden: Brill.

Bentley (2010): Kay Bentley, *The TKT course: CLIL module*, Cambridge, UK: Cambridge University Press.

Binkley, Erstad, Herman, Raizen, Ripley, Miller-Ricci, Rumble (2012): Marilyn Binkley, Ola Erstad, Joan Herman, Senta Raizen, Martin Ripley, May Miller-Ricci, Mike Rumble, Defining twenty-first century skills. In P. Griffin et al. (Eds.), *Assessment and teaching of 21st century skills* (pp. 17–66). Melbourne: The University of Melbourne.

Brewster, Ellis, Girard (2004): Jean Brewster, Gail Ellis, Denis Girard, *The Primary English Teacher's Guide* (5th ed.), Harlow, UK: Pearson Education Limited.

Cenoz (2015): Jasone Cenoz, Content-based instruction and content and language integrated learning: the same or different?, *Language, Culture and Curriculum*, Vol. 28, No. 1, 8–24.

Coyle, Hood, Marsh (2010): Do Coyle, Philip Hood, David Marsh, *Content and language integrated learning*, Cambridge, UK: Cambridge University Press.

Curtain, Dahlberg (2010): Helena Curtain, Carol Ann Dahlberg, *Languages and children – Making the match: New languages for young learners*, 4th ed, Boston, MA: Pearson.

Enever, Moon (2009): Janet Enever, Jayne Moon, New global contexts for teaching Primary ELT: Change and challenge. In Janet Enever, Jayne Moon, Uma Raman (Eds.), *Young Learner English Language Policy and Implementation: International Perspectives* (pp. 3–21), Reading, UK: Garnet Publishing Ltd.

Ioannou Georgiou (2012): Sophia Ioannou Georgiou, Reviewing the puzzle of CLIL. *ELT Journal*, Volume 66, Issue 4, 495–504, https://doi.org/10.1093/elt/ccs047.

Kadijević (2019): Djordje M. Kadijevich, Influence of TIMSS research on the mathematics curriculum in Serbia: Educational standards in primary education, *The Teaching of Mathematics*, Volume 12, No. 1, 33–41.

Mehisto (2012): Peeter Mehisto, Criteria for producing CLI learning material, *Encuentro* 21, 15–33.

MoESTD (2018): Ministry of Education, Science and Technological Development (MoESTD), Republic of Serbia, *Progress report on the action plan for implementation of the strategy for education development in Serbia by 2020*. Retrieved from http://www.mpn.gov.rs/wp-content/uploads/2018/08/AP-SROS-IZVESTAJ-15jun-Eng.pdf

Novotná, Moraová (2005): Jarmila Novotná, Hana Moraová, Cultural and linguistic problems in the use of authentic textbooks when teaching mathematics in a foreign language, *ZDM 2005*, Vol. 37, No. 2, 109–115.

Novotná, Moraová, Hofmannová (2009): Jarmila Novotná, Hana Moraová, Marie Hofmannová, Using original textbooks when teaching mathematics in a foreign language. In *European Research in Mathematics Education III*.

Official Gazette 10 (2017): Official Gazette of the Republic of Serbia 10: Rule Book on the First Cycle Primary Education Curriculum and the First Grade Curriculum, *Education Gazette*, 10/17. Retrieved fromhttp://www.pravno-informacioni-sistem.rs/SlGlasnikPortal/viewdoc?uuid=f5a145fb-96a0-44ed-bcb3-b00cfb189a72

Official Gazette 16 (2018): Official Gazette of the Republic of Serbia 16, Rule Book on the Second Grade Curriculum, *Education Gazette*, 16/18. Retrieved from https://zuov.gov.rs/download/pravilnik-o-nastavnom-programu-za-drugi-razred-osnovnog-obrazovanja-i-vaspitanja/

Official Gazette 5 (2019): Official Gazette of the Republic of Serbia 5, Rule Book on the Third Grade Curriculum, *Education Gazette*, 5/19. Retrieved from https://zuov.gov.rs/download/3-razred-osnovne-skole-nastavni-program/

Official Gazette 11 (2019): Official Gazette of the Republic of Serbia 11, Rule Book on the Fourth Grade Curriculum, *Education Gazette*, 11/19. Retrieved from https://zuov.gov.rs/download/4-razred-nastavni-program/

Pinter (2011): Annamaria Pinter, *Children learning second languages*, Basingdtoke: Palgrave Macmillan.

Read (2003): Carol Read, Is younger better?, *English Teaching Professional*, Vol. 28, 5–7.

Savić, Shin (2013): Vera Savić, Joan Kang Shin, Contextualising language learning through stories in Serbia, *Teaching Innovations*, Vol. 26, No. 1, 62–83.

Savić, Shin (2016): Vera Savić, Joan Kang Shin, Improving quality of primary English language teaching in Serbia through Theme-Based Instruction. In: J. Teodorović (Ed.), *Improving Quality of Elimentary Education* (pp. 328–338). Jagodina: Faculty of Education.

Shin (2007): Joan Kang Shin, Developing dynamic units for EFL, *English Teaching Forum*, Vol. 45, No. 2, 2–9.

Shin, Crandall (2014): Joan Kang Shin, Jodi Crandall, *Teaching young learners English: From theory to practice*, Boston: Heinle ELT, Cengage Learning.

Vera M. Savić
Univerzitet u Kragujevcu
Fakultet pedagoških nauka u Jagodini
Katedra za filološke nauke

INTEGRACIJA MATEMATIČKIH SADRŽAJA SA SADRŽAJIMA ENGLESKOG JEZIKA PRIMENOM INTEGRATIVNOG PRISTUPA

Rezime: Uspešnost u učenju stranog jezika ogleda se u sposobnosti da se strani jezik koristi u različitim kontekstima. Da bi se učenici mlađeg uzrasta u Srbiji pripremili da engleski jezik svrsishodno koriste u različitim životnim situacijama, potrebno je da se u nastavi kreiraju raznovrsni konteksti, što se uspešno može ostvariti integracijom nastavnih sadržaja drugih predmeta sa nastavom predmeta Engleski jezik. Integracija matematičkih nastavnih sadržaja sa jezičkim sadržajima može se realizovati primenom integrativnog pristupa u nastavi engleskog jezika, kojim se istovremeno mogu razviti jezičke veštine učenika i njihovo razumevanje matematičkih pojmova na zabavan i motivišući način. Cilj rada bila je analiza matematičkih sadržaja u udžbenicima stranih izdavača, koji se koriste u nastavi engleskog jezika na mlađem uzrastu u Srbiji, sa fokusom na modele integracije tih sadržaja sa jezičkim sadržajima. Primenjena je metoda analize sadržaja sedam udžbeničkih kompleta, pri čemu su matematički sadržaji analizirani u odnosu na šest istraživačkih pitanja. Rezultati su ukazali na četiri ključne kategorije integrisanih sadržaja, na osnovu kojih je zaključeno da je u nekim od analiziranih udžbenika matematički sadržaj uspešno integrisan sa jezičkim i da omogućava dublje razumevanje kako matematičkih, tako i jezičkih sadržaja koji su sa njima povezani. Međutim, rezultati su takođe ukazali i da analizirani matematički sadržaji nisu u potpunosti usklađeni sa razrednim kurikulumom, kao i da su kognitivno nezahtevni, što ukazuje na potrebu da nastavnici engleskog jezika obezbede dodatne nastavne materijale kojima bi se proširile postojeće kroskurikularne veze između sadržaja matematike i engleskog jezika. Pedagoške implikacije vezane su za potrebu za stručnim usavršavanjem u ovoj oblasti kako bi integrativna nastava engleskog jezika omogućila da učenici dožive iskustvo holističkog obrazovanja.

Ključne reči: učenici mlađeg uzrasta, integrativna nastava engleskog jezika, matematički sadržaji, plan i program osnovnog obrazovanja i vaspitanja, udžbenici engleskog jezika.