Pakistan Journal of social Sciences (PJSS)
Vol. 37, No. 1 (2017), pp. 30-43

Curriculum Alignment: An Analysis of the Textbook Content

Abdul Jabbar Bhatti
Senior Headmaster
Punjab School Education Department, Pakistan
ajbinzoo@yahoo.com

Khalid Khurshid
Associate Professor
Bahauddin Zakariya University, Multan
khalidkhurshid@bzu.edu.pk

Gulzar Ahmad
Assistant Professor,
Preston University, Kohat Campus
dr.gulzar2016@gmail.com

Abstract

Punjab Curriculum and Textbook Board [PCTB] publishes textbooks for the students of Grades I through XIIin the Punjab.Thesetextbooks have been developed according to the Pakistan NationalCurriculum.Content of the textbook for Biology-X was analysed for alignment with the curricular content. Surveys of Enacted Curriculum method [SEC] was used to measure the alignment level. Recently, SEC method has been used internationally tomeasure the alignment among curriculum, instruction, and instructional materials. The content of the textbook was analysed with respect to students learning outcomes [SLOs] given in the curriculum. Two experts analysed the content in the textbook on content analysis protocol.It was found that content in the Biology-X textbook was not aligned to a desired level (AI was 0.62). This misalignment was not same for all the categories of cognitive demand.

Key words: Textbook, Curricular content, Curriculum alignment, curriculum evaluation,textbooks,

Introduction

The textbooks are among major vehicles for students' learning (Aziz & Zain, 2010; Oakes & Saunders, 2002; Spillane, 2004). Studies show that students' learning is directly affected by the quality of textbooks (Allington, 2002).Teachers and the students consider textbooks to be sole representations of the relevant curriculum.The textbooks are assumed to reflect cognitive, affective and psychomotor abilities demanded by the curriculum. Studies (e.g. Carney, 2011, Stein, Remillard& Smith, 2007) showed that the curricular content not included in the textbooks is also excluded from the classroom instruction. Ideally, the textbooks are developed as the "visible, tangible and practical manifestation of the curriculum" and these textbooksinclude content that curriculum developers proposed to be taught in the classroom (Mahmood, Iqbal, & Saeed, 2009, p. 1).The degree of congruence between the textbook and the curriculum is termed as the alignment of curriculum with thetextbook.

Recently, the educationists have placed significant emphasis upon curriculum alignment (Porter, Smithson, Blank, & Zeidner, 2007, p.1). The educationists are of the opinion thatstudents' learning is much improved due to better curriculum alignment enhances (McFadden, 2009; EdSource, 2006, p. 2). Moreover,students' performance in the assessment also gets better(Murphy, 2007, p. 75). Roach, Niebling & Kurz, 2008, p. 158) have suggested that the level of correspondence among curriculum, instruction, and assessment is termed as curriculum alignment which ensures improved learningof students. Teaching and learning resources are vital components of instruction and the curriculum alignment cannot be achieved unless these resources are aligned with the curriculum. So, educationists (e.g. Kuhn & Rundle-Thiesle, 2009) also consider the educational resources with instruction and assessment in the curriculum alignment.

The textbooks are important educational resources which need to be aligned with the curriculum. The alignment of textbooks with the curriculum ensures alignment of instruction and assessment with curriculum. Therefore, development of textbooks aligned with the curriculum is consideredone of the basic steps in the implementation of curriculum (Fan, 2010, p.2).The textbooks also play crucial role in preparing students for the external examinations. Fan (2010) contends that admirable performance of Singapore students' in the international examinations owes much to the quality of textbooks. In Pakistannon-availability of national curriculum to the working teachers makes internal and external examinations more dependent upon the textbooks. Therefore, the performance of students in assessment is highly dependentupon the quality of textbooks.

Punjab Curriculum and Textbook Board [PCTB] has developed textbooks that are aligned with the approved curriculum. However, as Schmidt et al.(2001)also assert that research does not endorse the publishers' claim of developing textbooks according to the curriculum, the textbooks in Punjab may not be necessarily aligned with the curriculum. For example,Human Development Foundation (2004) contends that the textbooks in Pakistan not onlyhave language and presentation problems but

also deviate from the national curriculum.Moreover, in Punjab, studies have analysed the textbooks and the curriculum separately. Mahmood (2011) examined the quality of textbooks in Pakistan on the globally accepted criteria of quality of textbooks.Bhatti, Jumani and Malik (2015) found in their study that most of the educational managers, teachers and students in Punjab take textbooks as the curriculum. It may be because most of the teachers in Pakistan have little access to the national curriculum (Bano, 2005;Mahmood, 2011).Similarly, Bhatti, Jumani and Bilal (2015) analysed the alignment of Biology-IX textbook for alignment with the curriculum and found misalignment among these.

Analysis of studies conducted on textbooks in Punjab shows that (a) quality of textbooks has been examined independently, (b) few studies have analysed textbook in relation to the curriculum and even these studies have not employed the recent alignment measurement methods, and (c) textbook content may not be congruent with the content suggested in the curriculum. Moreover, PCTB claims that its textbooks are aligned with the national curriculum. Additionally, the alignment of textbooks with the curriculum is in line with the "curriculum implementation framework Punjab-2014" prepared by Punjab Curriculum and Textbook Board (2014, p. 3). However, gaps in literature exist about the studies giving the quantitative measure of degree of alignment of the textbook content with the content in national curriculum. The present study was an endeavorfor investigating how much the content of Biology-X textbook is aligned with the curriculum by employing the recent method of measurement of curriculum alignment.

Literature Review

Quality of Textbooks

Textbooks are the major source of concepts, ideas and the content for classroom teaching and learning. Textbooks are the base for selection of content by the teachers for instruction (English, 1986). Textbooks shape the activities of the teacher and students in the classroom. In fact,major part of classroom instruction consists of interaction of textbooks with students and teacher (Brown, 2009).Mostly, the teachers and the students take textbooks as the valid and reliable source of knowledge(John, 2001).Govt. of Pakistan(2006, p. 2) admits that textbooks are the sole teaching-learning resources available to most of the teachers and students in Pakistan. Kumari and Mohammad (2007, p. 8) suggest that mostly teachers in Pakistan have limited content knowledge and it places additional responsibility upon the textbook developers to ensure that textbooks have adequate knowledge and are error-free. Therefore, proper mechanism is adopted to develop and publish textbooks so that the content in the textbooks is reliable, error-free and unbiased.

However, studies show that textbooks in Pakistan lack effectiveness.Mahmood (2011,pp. 179-180) found that the textbooks in Pakistan did not fulfil the globally accepted quality standard of textbooks. He also found that the evaluation of the textbooks was not conducted properly.Afzal (2015, p. 1) found that the textbooks are "memorized verbatim" and discourage discussion and critical thinking. Nayyar(2013) also analyzed the textbooks in Pakistan and concluded that

the new textbooks were better than the previous ones, however, still these were not freefrom many weaknessesincluding poor use of language. Hashmi (2014, p. 67) analysed Pakistan Studies textbook on an adapted checklist ofMarsh & White(2006) and found that the said textbook had a number of flaws with respect to content including content selection, outdated information, and incongruence with the curriculum.

Ghaffar-Kucher and Awan (2013, p. 1) argue that poor quality of textbooks, which is unable to inculcate "higher-order thinking skills"among the students, is onethe major causes of ineffective education system in Pakistan. Similarly, Hoodbhoy (2015) is also dissatisfied with the content, language, presentation and "lack of conceptual understanding" of the science textbooks in Pakistan (particularly textbooks in Sindh province) that he cries out to "burn out these books".

Alignment of Textbooks with the Curriculum

PCTB has developed quality standard for developing textbooks. The first standard for developing a quality textbook is about authors' comprehension of curriculum of the particular subject (Punjab Textbook Board, 2014). It shows that textbook's congruence level with the curriculumis a major criterion for evaluation of the textbook. However, in Punjab NCTB has adopted the national curricula 2006 developed by Federal Ministry of Education and has developed textbooks according to that curriculum. According to Hume and Coll (2010, p. 43) alignment of curriculum decreases if curriculum there is gap between the curriculum developers and its implementers.This is also indicated by research studies. Mahmood (2011,p. 179) found that the textbooks were inconsistent with the curriculum with respect to "basic curriculum components i.e. objectives, detail/scope of content, teachingmethodology and assessment, along with guidelines for authors". Moreover, he also concluded that the textbooks developers in Pakistan were not well-aware of the curriculum. Nayyar(2013, p. 3) also identified that the textbooks in Pakistan were the "misinterpretation or misrepresentation" of the curriculum.

Studies (e.g. Shah, 2012) and our personal experience indicate that external assessment at secondary levelin Pakistan depends thoroughly upon the textbooks. While developing the test items, the test item developers have to write the specific page number of the relevant textbook. It necessitates that the content in textbooks is congruent with the content in the curriculum to ensure that assessment measures what is suggested in the curriculum.In Pakistan, sourceof assessmentis the textbooks and well aligned textbooks may potentiallyimprove instruction (Shah, 2012, p.37).Çepni and Karab(2011, p. 3226) also suggest the same when they claim that in developingcountries the test items in the examinations are mostly delimited to content in the textbooks.This dependence of examinations on the textbooks puts heavy responsibility upon the textbook developers to develop textbooks which have content as stipulated by the curriculum. Unless the content in textbooks is congruent with the content in curriculum, we cannot expect the examinations to be congruent with the curriculum. If the content in the textbook is congruent with that of

curriculum, it will result in the assessment which will not measure the intended outcomes.

The dependence of examinations on the textbooks has another consequence. The teachers and the students solely depend on the textbooks instead of the curriculum. Thus, classroom instruction will mostly be confined to the textbooks. The same is happening in Pakistan. Mostly teachers and students in Punjab think that the textbooks are the curriculum(Bhatti, Jumani & Malik, 2015).Thus, textbooks are not just mediators between the curriculum and classroom instruction, as suggested byJohonsson (2003), but the curriculum itself.This situation requires that the content in textbooks is congruent with that of curriculum. If the content in the textbooks is not properlycongruent with that of curriculum, the teacher's instruction will be about objectives other than those suggested in the curriculum. Consequently, the students' achievement will not be according to those intended in the curriculum.In order to make instruction andstudents' achievement in accordance with what is intended in the curriculum, it is essential that the textbooks are well aligned with the curriculum.

Overview of National Curriculum for Biology-2006& Textbook Biology-X

National Curriculum 2006 for Biology is a comprehensive document suggesting the standards, benchmarks, themes, students' learning outcomes, guidance for textbook development and assessment. It also outlines the instructional strategies and the resources necessary for its implementation. The content consists of six broad categories which are marked as sections. Over all the list of content consists of 76 major themeswith 60 subthemes. An important feature of the National Curriculum 2006 for Biology for secondary classes is that it outlines "realistic, observable, achievable and measurable" students' learning outcomes (GOP, 2006, p. 5). The students' learning outcomes have been developed from 28 benchmarks and 13 standards suggested for the subject of biology at secondary level.

The outcomes have been classified into following three categories:

- *Understanding* (cognitive domain of Bloom's taxonomy of objectives)
- *Skills* (psychomotor domain)
- *STS Connections* (i.e. Science-Technology-Society connections)

The distribution of learning outcomes for secondary classes (Grade-IX & X) is given in Table 1.

Table 1

Distribution of learning outcomes for secondary classes (Grade-IX & X)

	Understanding		Skills		STS	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Grade-IX	172	64%	73	27%	25	09%
Grade-IX	160	60%	56	21%	51	19%
Total	332	61.8%	129	24%	76	14.2%

There are two textbooks for secondary level i.e. Biology 9 for Grade IX &Biology 10 for Grade X. The contents of the Biology 10 have been divided into four sections (life processes, continuity of life, ecology and applications of biology). The textbook Biology 10 consists of sections and chapters. The textbook Biology 10 has been divided into sections and chapter like that of curriculum. The content also includes the tables and figures. Every chapter ends with the key terms, review questions. Moreover,students' learning outcomes and additional digital resources are also listed in the textbook. Table 2 shows that there is inconsistency between textbook content and allotted time in Biology Textbook 10.

Table 2

Inconsistency between textbook content and allotted time in Biology Textbook 10

Chapter No.	Class Periods allotted in the textbook	Pages	pages/period	Average Difference
1	10	16	1.6	+0.3
2	12	14	1.2	-0.1
3	19	25	1.3	+0.1
4	11	12	1.1	-0.2
5	16	24	1.5	+0.3
6	16	18	1.1	-0.2
7	16	24	1.5	+0.2
8	12	12	1.0	-0.3
9	10	9	0.9	+0.4

Statement of Problem

PCTB claims that it has published the textbooks which consist of content to fulfil the requirements of the National Curriculum. The research problem was to investigate level of alignment of Biology-X textbook developed by PCTB with the National Curriculum-2006 for Biology for Grade-X.

Research Question

The study investigated the question:

How much is the content of Biology (X) textbook aligned with curriculum?

Method

Surveys of Enacted Curriculum [SEC] method has been used across the globe, particularly in United States of America, for measuring the level of alignment instruction and instructional materials with curriculum, (e.g. Studies conducted by(a) Liu, Zhang, Liang, Fulmer, Kim, & Yuan, (2009) in China, USA & Singapore, (b) Ndlovu & Mji (2012) in South Africa, and (c) Bhatti, Jumani, & Bilal (2015) in Pakistan, (d) Kurz, Elliott, Wehby, & Smithson (2010) in USA). An important quality of SEC method for measurement of curriculum alignment is that it can be used for measurement of level of congruence between content in textbooks with the

content in curriculum. Therefore, SEC method of curriculum alignment was employed to find quantitative measure of alignment of content in textbookBiology - X with that of curriculum. For this SEC protocol was developed for curriculum and the textbook.

PCTB has developed one textbook Biology 10for Grade X. This Biology 10 textbook and National Curriculum for Grade-X were analysed. Two experts first analysed the curriculum and then the textbook. In the curriculum there were three categories of learning outcomes viz. Understanding, STS connection and skills. The learning outcomes relating to skills category were concerned with the skills related to practical work and were outside the domain of textbook. So, the learning outcomes relating to skills category were excluded from the analysis.

The content given in the textbook was analysed by two subject matter experts (panelists). The basis of analysis was the number and nature of Students Learning Outcomes [SLO]. Although SLO were given for every topic and sometime for subtopics, the number and nature of SLO were analyzed at chapter level. The research instrument (SEC protocol) consisted of nine rows for the nine chapters and six columns for the six categories of cognitive demand (Remember, Understand, Apply, Analyze, Evaluate, and Create). In this way a matrix of 9X6 (36 cells) was obtained for the curriculum. The same 9X6 matrix (36 cells) was obtained for the textbook. Then value in each cell was divided by the sum of values for every column. In this way sum of values in every column equaled to 1. Then ratio difference was found by subtracting the values of every cell of one matrix (for curriculum) from the corresponding cell of the other matrix (for textbook).Quantitative measure of alignment was calculated by using Porter's(2002)formula of alignment index. Moreover, tocalculate the strength of alignment, Fulmer's (2011) table of critical values was employed.This made possible to compare and contrast quantitatively the content in the textbook with that of curriculum.

Findings

Following findings emerged from the analysis of data.

Table 3

Alignment of Biology-X Textbook with Curriculum

Chapter No.	Ratio Difference of SLOs with respect to					
	Remember	Understand	Apply	Analyze	Evaluate	Create
1	0.01	0.04	0.07	0	0.33	0
2	0.01	0.05	0.14	0	0	0
3	0.00	0.08	0	0.50	0.17	0.50
4	0.01	0.01	0	0	0	0
5	0.01	0.06	0.14	0	0.17	0
6	0.01	0.07	0.21	0.50	0.17	0.50

7	0.03	0.04	0.29	0	0	0
8	0.00	0.06	0.14	0	0	0
9	0.02	0.01	0	0	0.17	0
Total	0.12	0.41	1.00	1.00	1.00	1.00
Alignment Index	**0.94**	**0.79**	**0.50**	**0.50**	**0.50**	**0.50**
Average Alignment Index			**0.62**			

Table 3 shows Alignment of Biology-X textbook with Curriculum. It is clear from the Table 3 that Alignment Index value is 0.62 which indicates that Biology-X textbook is not aligned with the curriculum (critical values of mean alignment index for 36 cells matrix is 0.9195). The content in the textbook is also misaligned individually with respect to all the categories of cognitive demand. Individually the calculated AI values for Remember, Understand, Apply, Analyze, Evaluate, & Create categories of cognitive demand are 0.94, 0.79, 0.50, 0.50, 0.50, & 0.50 respectively. The tabulated critical value for 10 cells is 0.9916. However, this misalignment is not same relating to different levels of cognitive domain. The content in textbook for the remember category is comparatively more aligned (AI=0.94) with the curriculum. The content in textbook for the Apply, Analyze, Evaluate, & Create categories is least aligned (AI=0.50) with the curriculum.

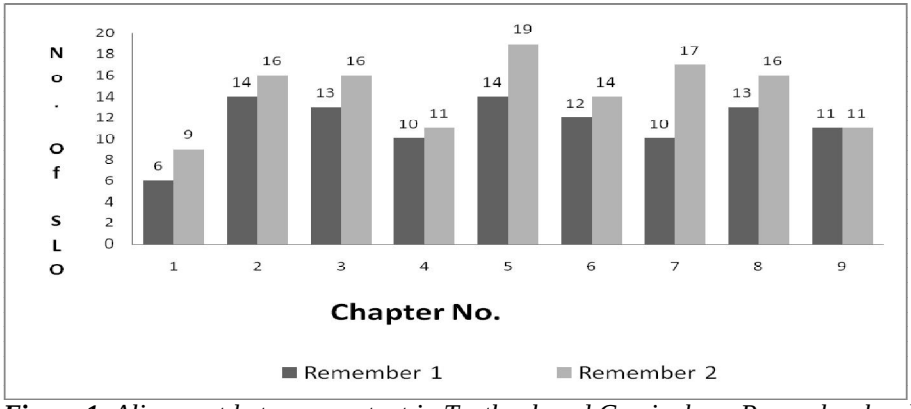

Figure 1*. Alignment between content in Textbook and Curriculum: Remember level (1= Curriculum, 2= Textbook)*

Figure 1 shows comparison of content in Biology-X textbook with curriculumrelating to Remember level of cognitive domain. It is obvious from the figure that, except in chapter 9, the textbook provides more content aboutlearning outcomes relating to remember level of cognitive domain as compared with that in curriculum. This difference is maximum in chapters 5 and 7.

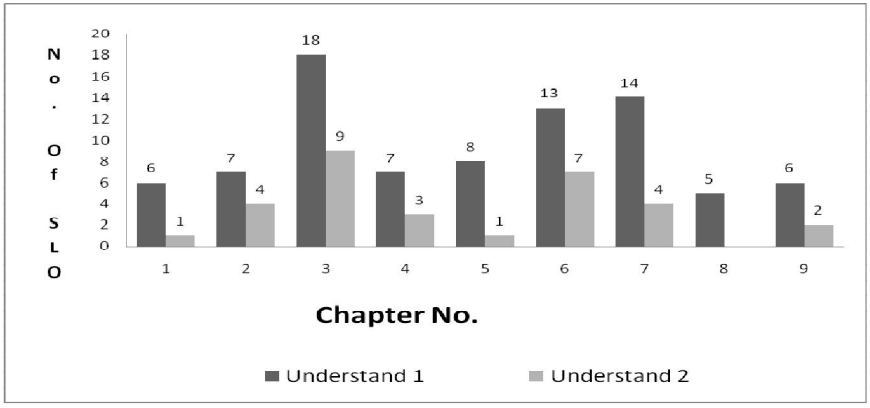

Figure 2*. Alignment between content in Textbook and Curriculum: Understand level* (*1= Curriculum, 2= Textbook)*

Figure 2 shows comparison of Biology-X textbook with curriculum with relating to the understand level of cognitive domain. It is obvious from the figure that the textbook provides less content about learning outcomes relating to understand level of cognitive domain as compared to that in curriculum. This difference is maximum in chapters 3, 6, 7 and 8.

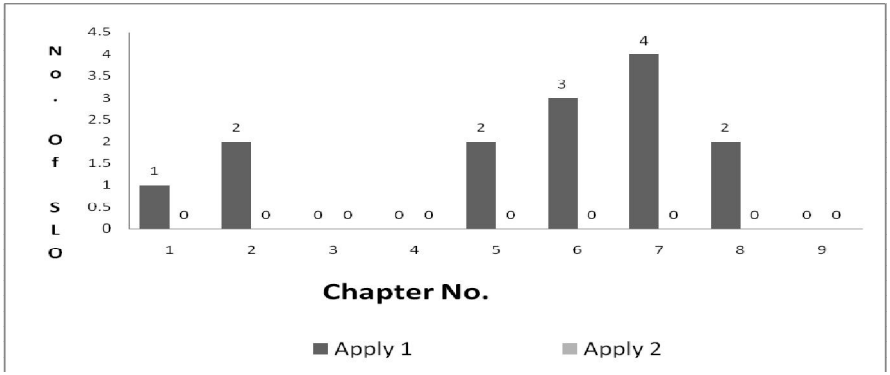

Figure 3.*Alignment between content in Textbook and Curriculum: Apply level* (*1= Curriculum, 2= Textbook)*

Figure 3 shows comparison of Biology-X textbook with curriculumrelating to applylevel of cognitive domain. It is clear from the figure that the textbook provides no content about learning outcomes relating to apply category of cognitive demand as compared with that of in curriculum.

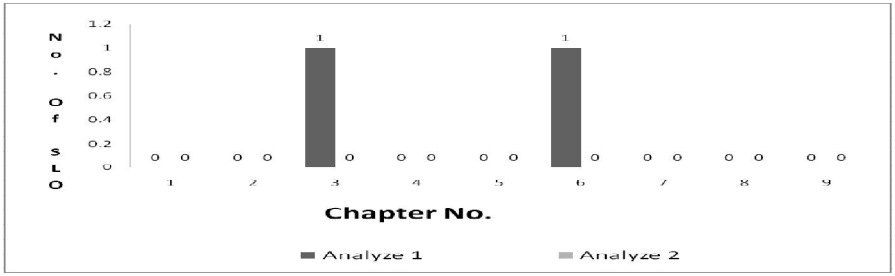

Figure 4.*Alignment between content in Textbook and Curriculum: Analyze level* (*1= Curriculum, 2= Textbook)*

Figure 4 shows comparison of Biology-X textbook with curriculumrelating to Analyzelevel of cognitive domain. It obvious from the figure that the textbook provides no content about learning outcomes relating to Analyze level of cognitive domain as opposed to the curriculum which suggests learning outcomes in chapters 3 & 6.

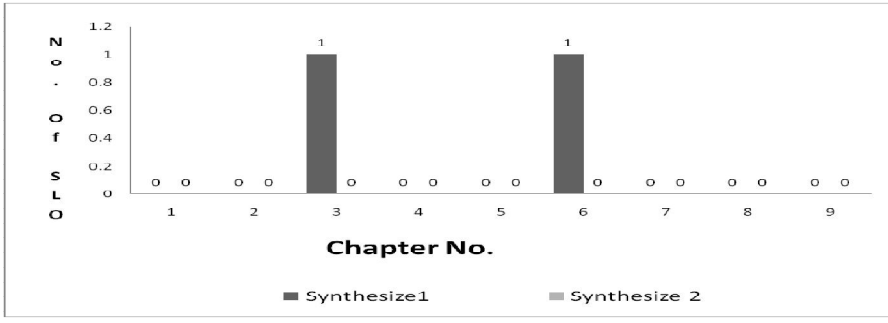

Figure 5.*Alignment between content in Textbook and Curriculum: Synthesize level* (*1= Curriculum, 2= Textbook)*

Figure 4 shows comparison of Biology-X textbook with curriculumrelating to Analyzelevel of cognitive domain. It obvious from the figure that the textbook provides no content about learning outcomes relating to Analyze level of cognitive domain as opposed to the curriculum which suggests learning outcomes in chapters 3 & 6.

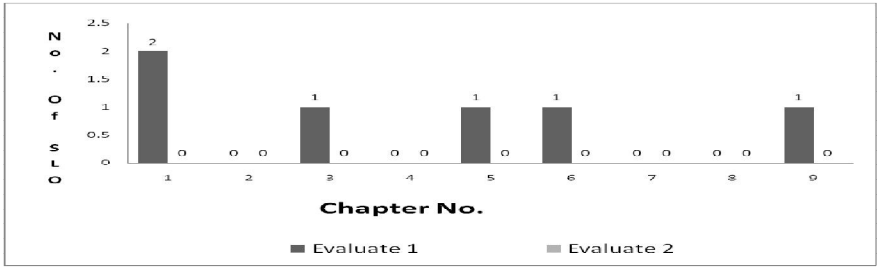

Figure 6.*Alignment between content in Textbook and Curriculum: Evaluate level* (*1= Curriculum, 2= Textbook)*

Figure 6 shows comparison of Biology-X textbook with curriculumrelating to evaluatelevel of cognitive domain. It is obvious from the figure that the textbook provides no content about learning outcomes relating to evaluate level of cognitive domain as opposed to the curriculum which suggests learning outcomes in chapters 1, 3, 5, 6&9.

Discussion

The content in the Biology-X textbook was misaligned with the curriculum (AI was 0.62). This misalignment was not same for all the categories of cognitive demand. The content of the textbook was comparatively more aligned with respect to Remember and Understand categories of cognitive demand. However, the textbook failed to provide content with respect to higher order of cognitive demand viz. Apply, Analyze, Evaluate, & Create.

Previous research (e.g. Akhtar (2004), Rehman (2004) and Faize (2011)) showed that the textbooks' in Pakistan consisted of irrelevant content which could not ensure realization of outcomes proposed in the curriculum. Present research shows that the content in Biology-X textbook was only overloaded with respect to only Remember level of cognitive domain. The higher levels of cognitive domain needed more content. Surprisingly, the textbook consisted of less content relating to understandlevel of cognitive domain and no content with respect to higher order of cognitive demand.

For harmonizing the content in the Biology-X textbook with the curriculum, it is necessary that emphasis of content may be changed from lower level to higher level. There should be less content related to remember category of cognitive demand. More content is needed for Understand category of cognitive demand. In the curriculum, there are a few SLO with respect to higher order of cognitive demand viz. Apply, Analyse, Synthesize, and Evaluate. However, these SLO are very significant and content should be provided in the textbook to achieve these SLO.

The gap between the textbook and the curriculum reflects lack of coordination between curriculum developers and the textbook writers. There should be at least one common person in the development of curriculum and writing textbook to enhance the alignment between curriculum and the textbook.

References

Afzal, M. (2015). *Education and attitudes in Pakistan: Understanding perceptions of terrorism.* Washington, DC: United States Institute of Peace.

Akhtar, M. (2004). *Analysis of curriculum process and development of a model for secondary level in Pakistan* (Unpublished doctoral dissertation). University of Arid Agriculture Rawalpindi.

Allington, R. L. (2002). You can't learn much from books you can't read. *Educational Leadership, 60*(3), 16-19. Retrieved from http://www.westcler.net/ public_html/files/allingtonarticle.pdf

Aziz, M. S. & Zain, A. N. Md. (2010). The inclusion of science process skills in Yemeni secondary school physics textbooks. *European Journal of Physics Education*, 1(1), 55-64.

Bano, Y. (2005). Curriculum and Textbooks: Issues and Challenges in Pakistan. *ANTRIEP Newsletter, 10 (1),* 3-8.

Bhatti, A. J., Jumani, N. B., & Bilal, M. (2015). Analysis of alignment between curriculum and biology textbook at secondary level in Punjab.*Pakistan Journal of Social Sciences, 35* (1), 261-272.

Bhatti, A. J., Jumani, N. B., & Malik, S. Y. (2015). Professional development training of educational managers in Punjab: A follow up study. *Journal of Elementary Education. 25* (1), 55-74.

Brown, M. W. (2009). The teacher-tool relationship. In J. T. Remillard, B. A. Herbel-Eisenmann, & G. M. Lloyd (Eds.), Mathematics Teachers at Work: Connecting Curriculum Materials and Classroom Instruction (pp. 17-36). New York, NY: Routledge.

Carney, K. (2011).Think outside the book. *Learning & Leading with Technology;* August 2011, 10-14. Retrieved from http://files.eric.ed.gov/fulltext/EJ941904.pdf

Çepni, S. & Karab, Y. (2011). Aligning large-scale examinations to the curriculum guidelines: student selection examination and Turkish biology curriculum. *Procedia Social and Behavioral Sciences 1*, 3222–3226. doi:10.1016/j.sbspro.2011.04.275

Edvantia. (2005).*Aligned curriculum and student achievement: Research brief.* Charleston; Edvantia. Retrieved from http://sites.edvantia.org/pdta/pdf/ Aligned.pdf

English, F. W. (1986). It's time to abolish conventional curriculum guides. Educational Leadership, December 1986/January 1987, 50-52. Retrieved from http://www.ascd.org/ASCD/pdf/journals/ed_lead/el_198612_english.pdf

Faize, F. A. (2011).*Problems and prospects of science education at secondary level in Pakistan* (Unpublished doctoral dissertation). Faculty of Social Sciences, International Islamic University, Islamabad.

Fan, L. (2010). Principles and Processes for Publishing Textbooks and Alignment with Standards: A Case in Singapore. Paper presented at APEC Conference on Replicating Exemplary Practices in Mathematics Education, Koh Samui, Thailand, 7-12 Mar. 2010 [APEC#210-HR-01.4]. Retrieved from http://publications.apec.org/file-download.php?filename=2b%20Fan_210_hrd_exemplaryMaths.pdf&id=1047_toc

Fulmer, G. W. (2011). Estimating critical values for strength of alignment among curriculum, assessments, and instruction. Journal of Educational and Behavioral Statistics, 36 (3), 381-402. DOI: 10.3102/1076998610381397.

Ghaffar-Kucher, A. & Awan, A. (2013). *Pakistan's education conundrum.* East Asia Forum. Retrieved from http://www.eastasiaforum.org/2013/09/19/pakistans-education-conundrum/?format=pdf

GOP. (2006). *National Curriculum for English Language Grades I-XII,2006. Islamabad, GOP, Ministry of Education.*.

Govt. of Pakistan. (2006). Green Paper on Textbook and Learning Materials. Islamabad: Policy and Planning Wing, Ministry of Education.

Hashmi, K. (2014). Content analysis of the provincial Pakistan Studies textbook for class IX-X. *Journal of Education and Social Sciences, 2*(1), 67-77.

Hoodbhoy, P. (2015, December 12). Burn these books, please!. *Dawn*, p. 8.

Human Development Foundation. (2004). *The problem of Pakistan's textbooks.* Retrieved from http://www.yespakistan.com/education/problem_text.asp

Hume, A., & Coll, R. (2010). Authentic student inquiry: the mismatch between the intended curriculum and the student-experienced curriculum. *Research in Science & Technological Education, 28*(1), 43-62. doi:10.1080/02635140903513565

John, St. M. (2001). *The status of high school science programmes and curricular decision-making*. Inverness, CA: Inverness Research Associates.

Johonsson, M. (2003). *Textbooks in Mathematics education: A study of textbooks as potentially implemented curriculum* (Licentiate thesis). Lulea: Lulea University of Technology. Retrieved from http://epubl.luth.se/1402-1757/2003/65/LTU-LIC-0365-SE.pdf

Kuhn, K.-A. L. & Rundle-Thiele, S. R. (2009). Curriculum alignment: Exploring student perception of learning achievement measures. *International Journal of Teaching and Learning in Higher Education, 21* (3), pp. 351-361. Retrieved from *http://eprints. qut.edu.au/39467/1/39467.pdf*

Kumari, R. & Mohammad, R. F. (2007). Effective use of textbooks: A neglected aspect of education in Pakistan. *Journal of Education for International Development, 3*(1), 1-12.

Kurz, A., Elliott, S. N., Wehby, J. H. & Smithson, J. L. (2010). Alignment of the intended, planned, and enacted curriculum in general and special education and its relation to student achievement. *The Journal of Special Education, 44*(3), 131–145. doi: 10.1177/0022466909341196

Liu, X., Zhang, B., Liang, L. L., Fulmer, G., Kim, B. and Yuan, H. (2009). Alignment between the physics content standard and the standardized test: A comparison among the United States-New York State, Singapore, and China-Jiangsu. *Science Educator, 93*(5): 777–797. doi: 10.1002/sce.20330

Mahmood, K., Iqbal, M. Z. & Saeed, M. (2009). Textbook evaluation through quality indicators: The case of Pakistan. *Bulletin of Education and Research. 31*(2), 1-27

Mahmood, M. (2011). Conformity to quality characteristics of textbooks: The illusion of textbook evaluation in Pakistan. *Journal of Research and Reflection in Education, 5*(2), 170-190.

Marsh, E. E., & White, M. D. (2006). Content analysis: A flexible methodology. *Library trends, 55* (1), 22-45.

Murphy, J. (2007). Restructuring through learning-focused leadership. In H. J. Walberg (Ed.), *Handbook on restructuring and substantial school improvement* (pp. 63–75). Lincoln, IL: Center on Innovation and Improvement.

Nayyar, A. H. (2013). A missed opportunity: continuing flaws in the new curriculum and textbooks after reforms. Islamabad: Jinnah Institute.

Ndlovu, M., & Mji, A. (2012). Alignment between South African mathematics assessment standards and the TIMSS assessment frameworks. *Pythagoras, 33*(3), Art. #182, 9 pages. http://dx.doi.org/10.4102/ pythagoras.v33i3.182

Oakes, J. & Saunders, M. (2002). *Access to textbooks, instructional materials, equipment, and technology: Inadequacy and inequality in California's public schools.* Los Angeles; University of California. Retrieved from https://escholarship.org/uc/item/4ht4z71v

Porter, A. C., Smithson, J., Blank, R., & Zeidner, T. (2007). Alignment as a teacher variable. *Applied Measurement in Education*, *20*(1), 27-51. Retrieved from http://www.andyporter.org/papers/Alignment.pdf.

Punjab Curriculum and Textbook Board. (2014). Curriculum implementation framework Punjab-2014. Lahore: Punjab Curriculum and Textbook Board.

Punjab Textbook Board. (2014). *Quality standards for developing a textbook.* Retrieved from Punjab Textbook Board's website http://ptbb.pitb.gov.pk/how_a_textbook_develops

Rehman, F. (2004). *Analysis of National science curriculum (chemistry) at secondary level in Pakistan* (Unpublished doctoral dissertation). University of Arid Agriculture, Rawalpindi.

Rehman, F. (2004). *Analysis of National science curriculum (chemistry) at secondary level in Pakistan* (Unpublished doctoral dissertation). University of Arid Agriculture, Rawalpindi.

Roach, A. T., Niebling, B. C. and Kurz, A. (2008). Evaluating the alignment among curriculum, instruction, and assessments: Implications and applications for research and practice. *Psychol. Schs.*, *45*, 158–176. doi: 10.1002/pits.20282

Schmidt, W. H., McKnight, C. C., Houang, R. T., Wang, H. A., Wiley, D. E., Cogan, L. S., & Wolfe, R. G. (2001). Why schools matter: A cross-national comparison of curriculum and learning. San Francisco, CA: Jossey-Bass.

Shah, S. F. (2012). An investigation into the alignment between the Governments's dictated English language curriculum and the textbook mediated classroom practice at the secondary level in Pakistan. A Master of Philosophy thesis at Nottingham Trent University. Retrieved from http://irep.ntu.ac.uk:1801/webclient/StreamGate?folder_id=0&dvs=1411145301587~702

Spillane, J. P. (2004). Standards deviation: How schools misunderstand education policy. Cambridge, MA: Harvard University Press.

Stein, M., Remillard, J., & Smith, M. (2007). How curriculum influences students' learning. In F. Lester (Ed.), Second handbook of research on mathematics teaching and learning (pp. 557–628). Charlotte: Information Age.