Blended Learning – Better Education and Lower Cost

By Jay Weinbach

Blended Learning seeks to improve both the quality and affordability of Independent Schools through curriculum that are teacher-led, student-centered, differentiated, and employ an element of machine learning. Better education and lower cost creates a virtuous cycle of sustainability.

In this article we will explain our Design Thinking approach by defining the problem to be solved, presenting the motivation of the persons who want the problems solved, our idea for solving them, our prototype and our plans for testing the proposed solution.

Our Motivation:

Both the funder of the project and I are a strong advocates for the educational advantages of Blended Learning. At the same time we are all grounded in the reality of the deep challenges to the sustainability of the current Independent School model, and even steeper challenge for dual-curriculum schools. Finally, I have experienced the challenge of attracting first-rate teachers to a smaller school. The funder provided over $1million dollars of seed money to produce a scalable prototype for a complete Judaic curriculum for Bible and other subjects.

The Problems To Be Solved

Educational improvement and financial sustainability – these drivers are truly inextricable.

Education

A traditional class operates within certain constraints that impact on its educationally efficacy. In the regnant model a valuable segment of the instructor's time is spent on essential tasks that rest at the bottom of Bloom's taxonomy (Note: While we have based our work on the Understanding By Design model, for this article I have referenced Bloom's taxonomy for its more universal familiarity).

While it is not uniquely so, Bible study in the original Hebrew is particularly demanding of both of the lowest levels of the taxonomy - Knowledge and Comprehension. Knowledge includes skill mastery of terminology rooted in second and third languages that span different eras historically and therefore often have conflicting conventions.

Bringing students to basic mastery of text for even simple stories is time-consuming, both because of language acquisition and because appreciation of the narrative requires knowledge of the conventions of societies whose history and culture are usually unknown to the student. Additionally, in most but not all Jewish Day Schools, there is a canon of traditional interpreters to be added to the basic knowledge (for Bloom, this is included in Comprehension). While an instructor or school may choose to bypass elements of skill or knowledge acquisition, doing so undermines the richness of inter-textual interpretation that awaits at the higher levels of the taxonomy and which – along with the textual skills and classical knowledge base - is an explicit goal of many schools and almost all Orthodox schools. Furthermore, textual mastery is a strong predictor of later engagement with Jewish texts and hence Jewish continuity.

All skill instruction is time-intensive and individual needs vary to the extreme, even in more homogeneous or "tracked" classrooms. Additionally, as a generality the pace of skill instruction defaults to slightly above the mean level ("the middle"), which marginalizes the effect and efficiency for both advanced and more need-intensive students. This contributes an added risk factor for the more skills-needy students: absent time-intensive early intervention and remediation the skill gap increases with each grade until finally, at the high school level many a student is underserved. These students have a misalignment. Students with strong literary and thinking skills and weaker textual skills are relegated to class placements that leave them underserved intellectually and religiously. For the weakest students their lack of proficiency places them at-risk for weakened commitment to their Jewish future. With curricular goals set and demands on instructional time what they are, the instructor has little opportunity to achieve the meta-goal: impacting the life of each student.
In sum, in the regnant classroom model properly differentiating instruction of skills and fixed knowledge to maximize the little available class time is a herculean, and perhaps quixotic, challenge.

The Financial Challenge

The cost of education works against educational quality. Furthermore, it is doubtful whether the system can sustain the next economic "adjustment"; another loss of 10-15% to the system will lead to a significant diminution in educational quality far more profound than what resulted from the adjustment in 2008, most especially for our neediest learners.

Finally, the situation is already dire in schools and communities that lack the mass of available students to fill their open seats. The cost of more homogeneous classes at the upper levels is draining their already meager resources.

With the historic norm of an economic downturn every 7-8 years we are only a few years away from an unprecedented financial crisis in Independent education.

How Blended Learning Addresses Skill and Knowledge Acquisition

The basic building block of the learning experience is knowledge of the narrative in the text and the proper reading and translation of the text, including the development of the student's vocabulary. With basic skill acquisition – reading, translation and foundational knowledge - being supported or provided by machine learning the instructor is free to focus on providing students with higher-level learning at an individualized pace as well.

By moving most of the 40% of class time dedicated to skill development and introduction of the text of the commentaries from instructor to machine, we have achieved two outstanding educational benefits: improved teacher-student interaction, and differentiation that benefits even the fastest learners.

A Mekorot Bible unit includes

- Read the text in Hebrew, simple English, and a graphic novel, all with accompanying assessments
- Detailed translation of select verses to build translation skills
- Detailed presentation of a few commentaries
- Review of chapter themes using analytical literary skills
- Development of skills that provide deeper understanding of the text (map skills for Joshua, military strategy for Judges and Kings, linking to the Talmud)
- Presentation by leading teachers
- Assessment for mastery
- A Project-Based Learning element
- Advanced commentaries for the appropriate students

Understanding Blended Learning

To understand Blended Learning more clearly let's look at how a two-week unit might unfold.

Blended Learning Timetable

For learning management, Blended allows machine learning, small group activities and project work to be fungible; that is, teachers can decide that some students need more time on one or the other to support effective progress or to meet teacher or school preferences. One possible way to allot time for a 2-week unit is displayed in Chart 1. The first column lists the kinds of activities a typical class engages in. The next four columns suggest how much time (and the percentage) students, teacher and aide might spend in each activity for a 2-week unit. Note that the Instructor has 70% of their time dedicated to contact with individuals or small groups, dramatically improving the effectiveness of instruction.

Chart 1: Sample School Time Allocation for 2-Week Unit

Activity	%	Student	Teacher
Routine Class Management	5%	16 min	16 min
Teacher-led class	25%	80 min	80 min
Small Group Activities - Remediation - Mini lesson - Enrichment - Drill/practice	15%	48 min	199 min
Project work	15%	48 min	25 min
Machine learning instruction	40%	128 min	0 min
Total Time	**100%**	**320**	**320**

Chart 2 shows a second way of seeing how a blended class differs by academic grouping. The academic group is listed in the first column, and going across, the 320 minutes is divided into online learning plus 1-to-1 tutoring, project and small group activities, and finally whole-class instruction. The chart shows how the time for a 2-week unit may be differentially allocated based on student proficiency. You can see that we have assumed stronger students will complete the online learning components more quickly, and will therefore have more time for enrichment and project activities. In this way, we assure weaker students get sufficient time to achieve mastery and stronger students are not held back.

Chart 2: Sample Time Allocation by Proficiency Level

Skills Group	**320 minutes instructional time over 2 week Unit**		
Strong	80m Machine learning & 1-to-1	160m Project & Small Group Activities	80m Whole-class Instruction
Middle +	100m Machine learning, 1-to-1	140m Project & Small Group Activities	80m Whole-class Instruction
Middle	120m Machine learning, 1-to-1 & Remediation	120m Project & Small Group Activities	80m Whole-class Instruction
Middle–	140m Machine learning & 1-to-1 & Remediation	100m Project & Small Group Activities	80m Whole-class Instruction
Weak	160m Machine learning & 1-to-1 & Remediation	80m Project & Small Group Activities	80m Whole-class Instruction

The time allocation example assumes four 40-minute periods per week.

Chart 3 uses a Bible course to present another way to think about how Blended Learning can work. Considering a 2-week unit broken up into 20-minute time blocks, the chart displays what each of five ability groups might be engaged in at one time. In the chart, Group 1 represents the most able students, and Group 5 the least able. Column 1 indicates the time units in 20-minute blocks; the middle set of columns lists what activity each group is engaged in (online lesson, time with Instructor, project work, small group or testing;); and Column 3 reports the content sequence of the unit. This column tells you approximately where in the unit the middle three groups would be. Below the chart is a legend explaining the abbreviations.

Chart 3: Unit 1 – Example 2-Week Unit Schedule

Time	Classroom Time					Unit Sequence
	Groups					Groups
Minutes	1*	2	3	4	5+	2, 3, and 4*
0-20	**Teacher Lecture** - All groups together					Introduction to Unit
20-40	O	O	I	I	O	Introduction to Unit/ Reading skills
40-60	I/P	I	O	O	SG	Reading skills
60-80	O	SG	SG	SG	I	Finish reading skills. begin translation
80-100	O	O	O	I	O	Translation
100-120	O	SG	I	O	O	Read the chapter
120-140	SG	I	SG	SG	O	Read graphic novel
140-160	SG	O	I	O	SG	Translation of commentaries
160-220	**Teacher-led Discussion** All groups together or small group discussions					Teacher selected topic(s)
220-240	O	SG	O	I	SG	Translation of commentaries
240-260	SG	SG	SG	SG	I	Translation of advanced commentaries
260-280	P	I	I	I	P	Project work
280-300	T	T	T	**T**	T	Testing
300-320	**Teacher Lecture** – All groups together					Conclusion

O = Online Lesson **I =** Time with Instructor **P =** Project Work **SG =** Work in small groups or pairs **T =** Testing*The Unit Sequence is listed for Groups 2, 3, and 4. Group 1 is the most skilled and is likely to be ahead of this schedule; Group 5 is least skilled and is likely to be behind this schedule

How Blended Learning Addresses the Financial Challenge

Our premise is that in a standard classroom (for purpose of example, 20 students) almost all activities require the instructor to interact with all of the students, both as teacher and classroom supervisor. This places a significant limit on class size for two reasons – the instructor's time and energy must be divided somewhat equitably between the number of all students at all times, and the sole source for all student engagement is the instructor. Thus, the smallest unit being attended to at any time is the total number of students in the class, and each one cannot expect much more than their fraction of direct attention. As previously noted, in later grades the need for some homogeneous grouping of students requires differentiation that is costly in time and often in support staffing.

By contrast in a Blended Learning classroom, the only times an instructor must lead and supervise the full set of students (for purpose of example, 30) is for 40 to a maximum of 100 out of 320 minutes of the model unit (see Chart 2 above), and the remaining minutes of the unit is time when the instructor is working with individuals or small groups. With machine learning and group work providing additional sources for student engagement, two-thirds of the instructor's time is spent with only a quarter or a fifth of the students in the class in a far better instructional ratio of 8-1 or lower. Thus there is better differentiation for all learners, improved skill acquisition, and class size can be increased significantly – reducing cost of delivery by as much as a third! For smaller schools the Blended model allows students of different grade levels and skill backgrounds to learn together. The educational, social, and economic benefits are significant.
Let's look at the economics (the examples provided are from Bible classes yet are applicable to other subjects):

a) High School 1 has for efficiency combined 9th-10th- and 11th-12th-grade classes for Bible for a base total of two Bible classes. However, students come from a range of feeder elementary schools with varied levels of time having been dedicated to their Judaics and varied emphases on textual skills. To accommodate this diversity the school has two levels of Bible classes for each pairing of grade levels (still not

much differentiation, but an improvement), for a total of four classes. For simplicity, let's assign a standard fully loaded cost of $10,000 for each class. By employing a Blended Learning model the quality of differentiation is significantly improved, the need for two levels is eliminated, and the savings of $20,000 is significant.

b) To make matters more financially challenging, High School 2 is committed to separate-gender classes for Judaic Studies. Using the same variables of grades combined and two levels, they need 8 classes. Using the Blended Learning model, along with better delivery of education High School 2 saves $40,000 per subject area.

How Does Blended Learning Help Teachers?

Blended Learning will succeed only with the support of dedicated teachers. Early indications are that teachers enjoy a Blended Learning environment because they do less grading (the system does much of it for them) and less skill monitoring (a difficult and time-consuming task). In place of these the instructor can focus on leading discussions, explaining advanced concepts and working with small groups of students. Teachers have the opportunity to do what they set out to – interact with students and change their lives.

Summary

We have an unprecedented opportunity to greatly improve education in ways that will benefit all stakeholders – students, their families and the professional educators – and position our teachers to have a dramatically greater impact on our children. We welcome your comments and interest at our website, www.greatschoolscg.com.