A Solution to The Unexpected Examination Paradox

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In this paper I offer a solution to the paradox of unexpected examination by introducing the unexpected examinationless day paradox which consists of the same students' reasoning in another structure.

Let us recall the unexpected examination paradox at first.

> A teacher announces that an examination will be given on an unexpected day of the following week. The students argue that the examination can not be held on the last day of the week, since if it had not been held until then, they would know on the evening before the last day that it could only take place on the morrow and thus would not be unexpected. Nor could it take place on the next to the last day, for on the previous evening there would only be two days left for the examination and the last day having already been eliminated, the students would know that the examination would take place on the morrow and so again would not be unexpected. Similarly, each day of the week is eliminated, therefore the students argue that an unexpected examination can not be held on any other day of the week either. Nevertheless they are absolutely surprised when the examination is held on Tuesday.

We now introduce the unexpected examinationless day paradox.

> A teacher announces that six different examinations will be given on six different days during the following week and the remaining day will be an unexpected examinationless day. The students argue that

the examinationless day can not be the last day of the week, since if it had not been spent until then, they would know on the evening before the last day that it could only be the morrow and thus would not be unexpected. Nor could it be the next to the last day, for on the previous evening there would only be two days left for the examinationless day and the last day having already been eliminated, the students would know that the examinationless day would be the morrow and so again would not be unexpected. Similarly, each day of the week is eliminated, therefore the students argue that an unexpected examinationless day can not be any other day of the week either. Nevertheless they are absolutely surprised when no examination is held on Tuesday.

We prove that this argument can not be true. For suppose the teacher will not be able not to hold an examination on a day during the next week. Then he or she will necessarily hold an examination on each day of the week. In other words, when none of days of the week is an examinationless day, an examination is necessarily held on each day of the week and so the total number of examinations would increase to seven, whereas according to the teacher's announcement six examinations will be given during the following week.

The students' reasoning is false because of making this apparent contradiction and the unexpected examination paradox was resolved because of the existence of the same false reasoning in both of these two paradoxes.