**Par, Inc.**

Par, Inc., is a major manufacturer of golf equipment. Management believes that Par’s market share could be increased with the introduction of a cut-resistant, longer-lasting golf ball. Therefore, the research group at Par has been investigating a new golf ball coating designed to resist cuts and provide a more durable ball. The tests with the coating have been promising.

One of the researchers voiced concern about the effect of the new coating on driving distances. Par would like the new cut-resistant ball to offer driving distances comparable to those of the current-model golf ball. To compare the driving distances for the two balls, 40 balls of both the new and current models were subjected to distance tests. The testing was performed with a mechanical hitting machine so that any difference between the mean distances for the two models could be attributed to a difference in the two models. The results of the tests, with distances measured to the nearest yard, follow.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Model** | | **Model** | | **Model** | | **Model** | |
| **Current** | **New** | **Current** | **New** | **Current** | **New** | **Current** | **New** |
| 264 | 277 | 270 | 272 | 263 | 274 | 281 | 283 |
| 261 | 269 | 287 | 259 | 264 | 266 | 274 | 250 |
| 267 | 263 | 289 | 264 | 284 | 262 | 273 | 253 |
| 272 | 266 | 280 | 280 | 263 | 271 | 263 | 260 |
| 258 | 262 | 272 | 274 | 260 | 260 | 275 | 270 |
| 283 | 251 | 275 | 281 | 283 | 281 | 267 | 263 |
| 258 | 262 | 265 | 276 | 255 | 250 | 279 | 261 |
| 266 | 289 | 260 | 269 | 272 | 263 | 274 | 255 |
| 259 | 286 | 278 | 268 | 266 | 278 | 276 | 263 |
| 270 | 264 | 275 | 262 | 268 | 264 | 262 | 279 |

**Managerial Report**

1. Use appropriate descriptive statistics to summarize the driving distance data for each model. What similarities or differences do you observe from the sample data?
2. Use the tests of hypothesis procedure to comment on any difference between the population means for the two methods. Discuss your findings.
3. Compute the standard deviation and variance for each model. Conduct a hypothesis test about the equality of population variances for the two models. Discuss your findings.
4. What conclusion can you reach about any difference between the two models?
5. Can you suggest other data or testing that might be desirable before making a final decision on the golf ball to be used in the future?

**Air Force Training Program**

An Air Force introductory course in electronics uses a personalized system of instruction whereby each student views a videotaped lecture and then is given a programmed instruction text. The students work independently with the text until they have completed the training and passed a test. Of concern is the varying pace at which the students complete this portion of their training program. Some students are able to cover the programmed instruction text relatively quickly, whereas other students work much longer with the text and require additional time to complete the course. The fast students wait until the slow students complete the introductory course before the entire group proceeds together with other aspects of their training.

A proposed alternative system involves use of computer-assisted instruction. In this method, all students view the same videotaped lecture and then each is assigned to a computer terminal for further instruction. The computer guides the student, working independently, through the self-training portion of the course.

To compare the proposed and current methods of instruction, an entering class of 122 students was assigned randomly to one of the two methods. One group of 61 students used the current programmed-text method and the other group of 61 students used the proposed computer-assisted method. The time in hours was recorded for each student in the study. The following data are provided.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Completion Times (hours) for Current Training Method** | | | | | | | | | | |
| 76 | 76 | 77 | 74 | 76 | 74 | 74 | 77 | 72 | 78 | 73 |
| 78 | 75 | 80 | 79 | 72 | 69 | 79 | 72 | 70 | 70 | 81 |
| 76 | 78 | 72 | 82 | 72 | 73 | 71 | 70 | 77 | 78 | 73 |
| 79 | 82 | 65 | 77 | 79 | 73 | 76 | 81 | 69 | 75 | 75 |
| 77 | 79 | 76 | 78 | 76 | 76 | 73 | 77 | 84 | 74 | 74 |
| 69 | 79 | 66 | 70 | 74 | 72 |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Completion Times (hours) for Proposed Computer-Assisted Method** | | | | | | | | | | |
| 74 | 75 | 77 | 78 | 74 | 80 | 73 | 73 | 78 | 76 | 76 |
| 74 | 77 | 69 | 76 | 75 | 72 | 75 | 72 | 76 | 72 | 77 |
| 73 | 77 | 69 | 77 | 75 | 76 | 74 | 77 | 75 | 78 | 72 |
| 77 | 78 | 78 | 76 | 75 | 76 | 76 | 75 | 76 | 80 | 77 |
| 76 | 75 | 73 | 77 | 77 | 77 | 79 | 75 | 75 | 72 | 82 |
| 76 | 76 | 74 | 72 | 78 | 71 |  |  |  |  |  |

**Managerial Report**

1. Use appropriate descriptive statistics to summarize the training data for each method. What similarities or differences do you observe from the sample data?
2. Use the tests of hypothesis procedure to comment on any difference between the population means for the two methods. Discuss your findings.
3. Compute the standard deviation and variance for each training method. Conduct a hypothesis test about the equality of population variances for the two training methods. Discuss your findings.
4. What conclusion can you reach about any difference between the two methods?
5. Can you suggest other data or testing that might be desirable before making a final decision on the training program to be used in the future?